The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

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Contents

NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

The prepaid subscription to THE CHEMICAL AGE *is 21s. per annum for the United Kingdom, and 26s. abroad. Cheques, Money Orders, and Postal Orders should be made payable to Benn Brothers, Ltd.*

Benn Brothers, Ltd., proprietors of THE CHEMICAL AGE, *have for some years past adopted the five-day week, and the editorial and general offices (Bouverie House, 154, Fleet Street, London, E.C.4) are closed on Saturdays.*

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Safeguarding the People's Food

THE inspection—and, in a sense, formal opening—on Wednesday of J. Lyons and Co.'s new laboratory in Hammersmith Road, London, introduced both the scientist and the layman to a new development of chemistry's service to the community. To the scientist it was one more welcome proof of the growing appreciation by great industrial organisations of an efficient chemical service concentrated on the special problems of each industry. The teachers and practitioners of chemistry present must have been cheered to see the splendid scale on which the Lyons' chemical service had been planned and executed and to hear that the directors regard the outlay on it as an investment that more than pays its way. To the layman it must have been a revelation to see at how many vital points the chemist watches the food of the people, and the wonderful guarantee that his services provide for the safety of the table, whether of the wealthy or the poor. No small degree of imagination is needed to realise that, in a gigantic national catering organisation like Lyons', nothing goes into the works as raw materials and nothing goes out in the way of finished food until it has passed the searching tests of a large and expert chemical staff.

In the past, the unthinking public has too often associated chemistry in relation to food mainly with chemical substitutes for the genuine article. The enterprising Lyons policy disperses what is left of that obsolete idea, and reveals chemistry as the guardian of the people's table. As one diner-out put it, after seeing the splendid chemical organisation that Dr. Lampitt, the chief chemist, directs, "Whether one uses the 'Troc.' or the nearest little café, requires a first-class dinner or merely a cup of tea, one can feel quite safe in the hands of the Lyons chemist, after what has been shown us to-day." There were many high authorities present—the Government Chemist, whose work so largely consists in the protection of the public from impure food and drink,; Mr. Hinks, the president of the Society of Public Analysts; Professor Thorpe, the President of the Chemical Society; Mr. Francis Carr, ex-president of the Society of Chemical Industry, and others. All were impressed with the excellence of the new laboratory in every respect, and with the important addition it makes to the industrial chemical services of the country.

Not the least interesting feature of the inspection was the circulation of a delightfully written booklet on *The People's Food*, by Sir William Pope, who brings, as usual, learning and humour to his task. Of the quaint advertisements of the eighteenth and early nineteenth centuries that are reproduced, we particularly like "that compound of delicacy, the Anti-Eructative Sausage," which an enterprising Norwich food purveyor confidently commended to his patrons on the ground, that in the compounding of "these gems of epicurean dainty, cleanliness is a predominating characteristic." The quotations from that versatile chemist, Frederick Accum, also leave one feeling thankful that we are not exposed to the dangers of adulteration that he describes. It is a little alarming to read of such a cookery book recipe as the following:—"To render pickles green, boil them with halfpence or allow them to stand for twenty-four hours in copper or brass pans." To illustrate the risk of copper poisoning arising from such practices, an account is given "of a young lady who amused herself while her hair was dressing, with eating samphire pickles impregnated with copper. . . . In nine days after eating the pickle, death relieved her from her suffering." From these conditions it is pleasant to turn to the changes wrought largely by the application of chemical science to our food supplies, so as to ensure the quality and purity of all raw materials, the supervision of the processes of manufacture and the examination of finished products so that no deleterious effects result. "As time goes on," Sir William Pope writes, "the problem of feeding dense masses of humanity is

becoming intensified ; it calls for the further expansion of the great organisations entrusted with the task of collecting foodstuffs from different parts of the earth, preparing them and distributing them where needed. The task is becoming increasingly difficult and is calling more and more for close collaboration between commercial, technical and scientific talent." It is exactly such collaboration that the new Lyons laboratory illustrates and brings into operation on what is nothing less than a national scale.

Woollen Industry Research

THE annual report for 1928–29 of the British Research Association for the Woollen and Worsted Industries indicates the immense field that the term " research " now covers. From the Council's statement it appears that the decision of the Society of Dyers and Colourists to finance research on the standardisation of the fastness of dyestuffs on dyed fabrics has been carried into effect during the past year. The colour laboratories of the Association have been much extended and Dr. P. W. Cunliffe has been appointed to act as colour chemist under the scheme. Initial research has been commenced on standard tests for fastness to light and to washing ; and in connection with the tests for fastness to perspiration Dr. C. C. N. Vass is working with Professor B. A. McSwiney, of the Physiological Department of Leeds University, on the composition of sweat. As part of the work on the fading of dyestuffs on dyed fabrics, patterns have been faded, originally in the fadeometer, latterly in the fugitometer designed by the Association. They have also been sent to stations in different parts of the world for exposure to sunlight. The report of the director (Dr. Barker) covers the work of the Association in greater detail. The Research Association, it is interesting to hear, has arrived at a point when it is ready, in many directions, to develop its laboratory work on to a practical mill basis, but, under financial stringency, the industry is being deprived of the services of its results. It is obvious that, if the greatest good is to accrue to all concerned, the subsequent development of the results of research on an applied basis will have to be made by additional contributions to the funds. A further opportunity may occur of noticing some of the many interesting points with which the director deals.

The Oil and Colour Exhibition

THE second International Oil, Chemical and Colour Trades Exhibition is being held at the Royal Agricultural Hall, London, from to-day (Saturday) to Saturday, March 23. The trades represented form a highly important branch of British industry, and it is abundantly clear from the very representative displays in each section that British manufacturers are not lacking in enterprise. The exhibits include a very comprehensive range of the various grades of fuel, industrial and edible oils, petroleum, chemicals and colours, coal-tar products, fertilisers, soaps, waxes, etc., as well as all the latest inventions and developments in the way of manufacturing plant, machinery, and accessories. The exhibition has been organised by International Trade Exhibitions, Ltd. An honorary advisory committee, composed of prominent men in the oil, chemical, colour, and engineering industries, and strongly representative of the various interests concerned, has rendered valuable assistance in creating a trade exhibition of a very high order, which serves to prove that British manufacturers are by no means so apathetic as the pessimists would have us believe.

Books Received

ANNUAL REPORT OF THE BRITISH RESEARCH ASSOCIATION FOR THE WOOLLEN AND WORSTED INDUSTRIES, 1928-29. Headingley, Leeds. Pp. 60.

REVIEW OF THE EXTERNAL TRADE OF THE UNITED STATES OF AMERICA IN 1928. By A. J. Pack. London : H.M. Stationery Office. Pp. 50. 1s. 6d.

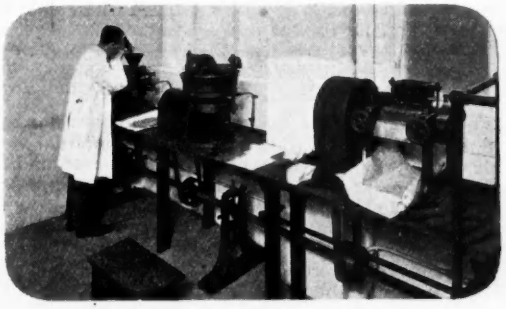
ENGINEERING AND INDUSTRIAL INSTRUMENTS. London: Negretti and Zambra. Pp. 460. 500 illustrations.

The Calendar

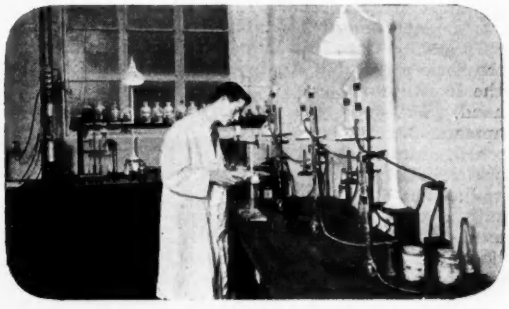
Mch		
18	Chemical Industry Club : " Hygiene and History." Dr. Charles Singer. 8 p.m.	2, Whitehall Court, London.
18	Institution of the Rubber Industry : " Some Reasons why the Rubber Industry is where it is." H. C. Young. 7.30 p.m.	Blackfriars Theatre, New Bridge Street, London.
18	Institute of Chemistry and Society of Chemical Industry (Edinburgh Sections) : " Heat Transmission." J. Arthur Reavell. 8 p.m.	36, York Place, Edinburgh.
18	Society of Dyers and Colourists (Huddersfield Section) : " The Practical Routine of Piece Dyeing." H. Wilkinson.	Huddersfield.
19	Institute of Chemistry (Bristol Section) : Annual Business Meeting. 7.30 p.m.	University, Bristol.
19	Hull Chemical and Engineering Society : " Naturally Occurring Catalyst Poisons in Oils." T. Andrews. 7.45 p.m.	Grey Street, Park Street, Hull.
19	Institute of Metals (N.E. Coast Section) : Annual General Meeting and Exhibition of Metallurgical Preparations and Products. 7.30 p.m.	Armstrong College. Newcastle-on-Tyne
19	Institution of Petroleum Technologists. Annual Meeting. 8.30 p.m.	John Street, Adelphi, London.
19	Institute of Metals (Birmingham Section) : " Aluminium." Dr. N. F. Budgen. 7 p.m.	Engineers' Club, Waterloo Street, Birmingham.
20	Institute of Chemistry (London Section) : " Ventilation Conditions, Normal and Abnormal, and their Investigation." R. C. Frederick. 8 p.m.	30, Russell Square, London.
20	Society of Glass Technology. 2.30 p.m.	The University, Leeds.
20	Institution of Chemical Engineers : Seventh Annual Corporate Meeting and Annual Dinner.	London.
20	Institute of Chemistry (Manchester Section) : Annual General Meeting. Paper by C. J. T. Cronshaw.	Manchester.
21	Chemical Society. Annual General Meeting and Anniversary Dinner.	Leeds.
21	Society of Dyers and Colourists (Midlands Section) : " Peroxide Bleaching." I. Weber. 7.30 p.m.	Technical College, Leicester.
22 & 23	Northern Polytechnic Chemical Association : Conversazione and Exhibition of Scientific Novelties.	London.
25	Society of Chemical Industry (Glasgow Section) : " The Activity of Various Catalysts in Promoting the Oxidation of Methane by Means of Oxygen." John R. Campbell. " A Simple Method for the Determination of Phosphorus in Coal Ash." W. J. Skilling and E. D. Ballantine. 7.30 p.m.	Royal Technical College, Glasgow.
26	Institute of Chemistry (Belfast Section) : X-Ray Demonstration. Dr. Allworthy.	Belfast.

J. Lyons & Co.'s New Laboratories.

THE NEW LABORATORY BUILDING.



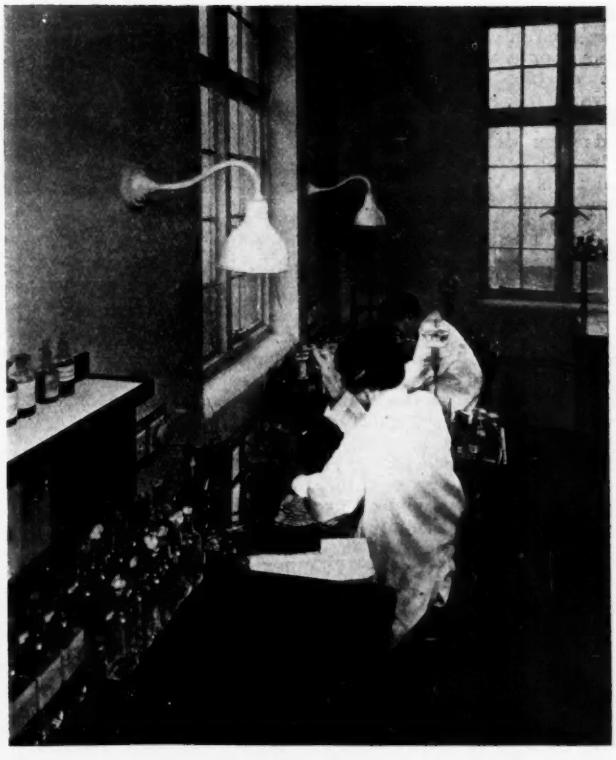
COCOA AND CHOCOLATE LABORATORY.



EDIBLE OIL AND FAT LABORATORY.

MILK PRODUCTS LABORATORY.

THE LIBRARY.



A CORNER OF THE MICROBIOCHEMICAL LABORATORY.

Opening of J. Lyons and Co.'s New Laboratories

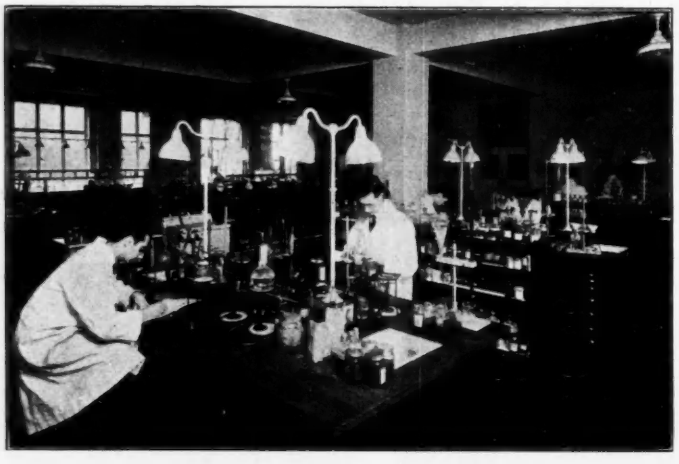
A Very Remarkable Enterprise

There was a large and distinguished company of scientists, industrialists and Press representatives at a formal inspection on Wednesday, of the new laboratories of J. Lyons and Co., Ltd., which have been erected in the Hammersmith Road, London, opposite Cadby Hall.

THE new laboratories of Lyons and Co. are housed in a handsome new building (of which external and internal views are published on the previous page). The layout and general equipment produced an extremely favourable impression on the visitors, and Dr. Lampitt, the chief chemist in charge, received many congratulations on having been able to carry out so satisfactory a scheme.

The guests were received by Major Isidore Salmon, M.P., and Mr. Maurice Salmon, on behalf of the board of directors, and were afterwards shown through the laboratories in parties by members of the chemical staff. Among those present were: Sir William Pope (University of Cambridge), Professor J. F. Thorpe (president of the Chemical Society), Sir John Russell (Rothampsted Experimental Station), Sir R. Robertson (Government Chemist), Mr. Francis H. Carr (ex-president of the Society of Chemical Industry), Mr. E. Hinks (president of the Society of Public Analysts), Mr. R. B. Pilcher (Registrar of the Institute of Chemistry), Mr. H. E. Field, Mr. F. W. F. Arnaud, Mr. A. J. Chapman, Mr. C. A. Mitchell, Mr. E. M. Hawkins, Dr. J. B. Howell, Dr. J. M. Hamill, Professor J. C. Drummond, Dr. J. M. Bulloch, etc.

After the inspection, lunch was served in the Refectory, and, although the informal character of the proceedings precluded any speeches, the visitors succeeded in conveying their appreciation to the directors for the privilege of inspecting this most interesting and modern of London's industrial laboratories, and to Mr. W. Buchanan-Taylor, the publicity manager, for the excellent arrangements.



THE GENERAL LABORATORY.

Notes on the Laboratory

The laboratory building, designed, erected and equipped by the company's own constructional and engineering departments, consists of seven floors, with a total area of some 35,000 square feet. Each working bench is supplied with water, gas, steam, a.c. and d.c. electricity, compressed air and vacuum; bench lighting is of the "daylight" type. Each floor is provided with master "push-button" controls for a.c., d.c. and lighting circuit breakers. Steam is available at three different pressures, 80 lb. for high temperature work, 25 lb. for steam ovens and water baths, and 10 lb. for bench service. In the fitting of the building, over 14,000 feet of copper pipe were used for gas, vacuum service, compressed air and water (except drinking water and distilled water); also 56 electric motors, 500 lighting points, 25 miles of electric cable and 60,000 electric fittings. The compressed air is supplied from a compressor in the boiler house, but each floor has its own electric vacuum pump.

The benches, cupboards, hoods, trunking, etc., were designed by the company's constructional and engineering departments, and made in the company's own workshops, as also was some of the special apparatus. Intercommunication between all laboratories and offices is provided by a Dictagraph telephone installation. Laboratories are provided for general and special purposes. At present some 40,000 samples are examined yearly, while research comprises more than one-third of the work of the laboratory.

On the roof of the building are situated the main ventilation fan, connected via the main vent shaft with all hooded benches throughout the building; four earthenware fans, connected to all fume cupboards; cold water storage tanks; and the lift and hoist motors and gear mechanism.

Upper Floors

On the fifth floor are research laboratories, with combustion, inoculation, balance and polarimeter rooms, for research work of special nature; distilled water room; and the staff refectory. The chief equipment is a distilled water plant.

On the fourth floor are the office of the chief chemist; the statistician's office; administration offices; the library and library office; and the textile laboratories, for the examination of textile materials, wrapping papers and laundry research. The chief equipment and apparatus is a yarn and cloth quadrant; a horizontal motor-driven cloth tester; a Mullen bursting strength tester; a deadweight lever thread tester; a microscope cloth counting glass; a constant humidity chamber; and an examination table.

Physical and Biochemical Laboratories

On the third floor are micro-biochemical laboratories, with incubator and preparation rooms, water analysis laboratory, media store and balance room, for the bacteriological examination of foodstuffs and the control of their manufacture; the physical chemistry laboratory, with principal dark room; constant temperature rooms; a thermostat room; a combustion room for arsenic determinations; and fruit products laboratories.

Among the equipment of these laboratories is a Kelvinator refrigerator; electrometric titration apparatus with Bovie H-ion potentiometer; H-ion apparatus with Leeds and Northrup potentiometer and Clark's rocking electrode in air thermostat; a bridge Megger testing set with "Dionic" conductivity cell; a thermo-couple and calibrated voltmeter; a Dr. Owen's dust counter; a travelling microscope; a du Nouy's surface tension apparatus; a quartz spectrograph; a photo-micrographic camera; a Klett nephelometer; a Hannovia quartz lamp; thermostats; and a Mojonnier moisture tester with Becker "quick-stop" balance.

Milk and Bakery Laboratories

On the second floor are a private laboratory and office; the milk products laboratories for the analysis of all milk products and control of ice-cream production; bakery products laboratories for control of bread and pastry-confectionery processes, and chemical and technical research applied to bakery; and a lubricant and fuel laboratory for the analytical control of fuels and lubricants. The equipment includes a Mojonnier fat and solids tester; a helical pasteuriser; centrifuges; a constant temperature proofing chamber; a high speed experimental dough mixer; electric baking ovens; and a polarimeter with mercury arc (green line).

On the first floor are the general laboratory with offices for all work of a general nature, with combustion, furnace, balance, polarimeter and wash-up rooms; a preparation room

for preparation and issue of reagents; and a general store for apparatus and chemicals. The equipment includes a Kjeldahl bench (Staybrite fittings); a titration bench (Staybrite fittings); a carbon dioxide supply bench; an Electrolux refrigerator; a Mojonnier moisture tester; and a Lovibond tintometer.

On the ground floor are the main entrance hall with waiting room, sample-receiving office and goods entrance; the cocoa and chocolate laboratories with combustion, volatile solvent distillation and balance rooms; and the edible oil and fat laboratory. The equipment includes stills; electrically-heated Soxhlet extraction apparatus; a Mojonnier moisture tester; plant for the treatment of cocoa, cocoa beans, and chocolate; experimental hydrogenation apparatus; and micro-projection apparatus.

On the basement floor are technical laboratory No. 1, containing small scale factory plant and machines for use in the investigation of large scale factory problems and in the testing of processes devised as a result of laboratory investigation. (This technical laboratory is used in conjunction with the laboratory process department situated in Cadby Hall); the boiler house, the equipment of which includes two boilers, one a steam generator, and the other a hot water generator for the heating of the building.) Apart from its service use, the boiler house is built as an experimental station for the investigation of steam generation and boiler problems generally); a machine shop, equipped for general instrument making and repair work; the heavy chemical store; and dynamo and switchboard rooms.

The equipment of the basement floor includes a Sharples super centrifuge; a small filter press; a laundry rotary washer with weigh meter; a laundry hydro extractor; laundry drying cupboards; a vacuum pan; a basket centrifuge; a Neckar water softener; flue gas recorders; temperature, pressure and general recording instruments; and an air compressor, with points on most benches throughout the building.

Chemical Trade Custom

Should Charcoal Bags be Charged For?

An alleged custom of the chemical trade formed the basis of an action in the Bow County Court, on Thursday, March 7, before Judge Thompson, when Thomas Hill-Jones, Ltd., Invicta Works, Bow Common Lane, London, manufacturing chemists, sued Durvite (1909), Ltd., of Victoria Works, 20, Turners Square, Hoxton, London, manufacturers of case hardening compounds, to recover £15 14s. 9d. for charcoal, and charcoal bags supplied.

The secretary to the defendant company declared that they were being charged 6d. each for the bags in which the charcoal was supplied, which was not right, and also they had been charged £6 a ton, instead of £5 15s., which was the market price. They admitted owing £7 10s., but had not paid it into Court. The charcoal, it was stated, was required for the manufacture of Durvite which was used in the manufacture of steel.

Mr. Sachs, for the plaintiffs, said that the claim was really for the bags. The parties had had very considerable dealings in charcoal, extending over a period of many years. The extra charge for the charcoal was because it was ordered in a small quantity instead of a 20 ton lot. For years the invoices were sent out with a note at the bottom to the effect that no empties would be allowed for unless returned carriage paid, and no credit at all unless returned in three months in good condition.

Mr. Willis, a director of the plaintiffs' chemical works, gave evidence as to the custom in the chemical trade of always charging for sacks.

For the defence, Mr. W. Harris, secretary of the defendant company, said they gave large orders for granulated wood charcoal, and the open market price was £5 15s., and not £6 as had been charged. He admitted that he had not noticed the note at the bottom of the plaintiffs' invoice, but declared that it was a custom of the trade not to charge for bags.

Judge Thompson said that the plaintiffs' invoices formed the basis of the contract. That clearly, in his opinion, threw upon the defendants the liability to pay for the bags, unless returned in good condition within three months. He found for the plaintiffs for the full amount claimed, with costs.

Newcastle Chemical Industry Club

To the Editor of The Chemical Age.

Sir,—The committee of the above club will be very glad if you will allow them through your columns to invite members of the chemical and allied societies to visit the club when they chance to be in Newcastle. They have particularly in view the forthcoming N.E. Coast Exhibition, to be opened on May 14 by the Prince of Wales, and to which many technical men will be coming.

Our premises are not palatial, but a game of bridge or billiards may prove a welcome alternative to a dull evening, and our reference library may be useful to those on business. Meals other than tea are not provided except by special arrangement, and bed-room accommodation is limited. Where possible, intending visitors, for their own benefit, should advise the undersigned, but, in any case, any who care to avail themselves of this invitation may rest assured of a hearty welcome by their Newcastle colleagues.—Yours, etc.,

Norman Dawson,
Hon. Sec.

5, Lovaine Row, Newcastle-on-Tyne.
March 7.

Society of Public Analysts

Annual General Meeting

The annual general meeting of the Society of Public Analysts was held at Burlington House, London, on Wednesday, March 6, when the president, Mr. Edward Hinks, delivered his annual address. The list of officers and council elected for 1929 was given in last week's issue of The Chemical Age.

An ordinary meeting of the Society then followed. Certificates were read for the first time in favour of P. T. Clarke, A. C. James, H. Lee, J. F. Morse, L. J. Odling and W. H. Wilkinson. Certificates were read for the second time in favour of F. Atkins, E. B. Bennion, J. Haslam, S. G. Kendrick, B. Jones, J. U. Lewin and L. J. Walker. The following were elected members of the Society:—W. B. Adam, A. L. Bacharach, A. Dargie and W. J. Itayim.

Alkaloids and Tannin

"The Alkaloid Test for Tannin" was discussed in a paper by Christine M. Fear (work done under the Analytical Investigation Scheme). It had frequently been asserted, said the author, that most alkaloids were precipitated by tannin, but experiments showed that the only alkaloids giving appreciable precipitates with tannin solutions alone were brucine, caffeine, cinchonine, cinchonidine, quinine and strychnine. Hence the assumption that alkaloids were a general reagent for the tannins required modification.

Water in Milk

Mr. A. L. Andrew dealt with "The Cryoscopic Method for the Detection of Added Water in Milk." The determination of the freezing point was found to afford a simple and reliable means of detecting added water in milk. The results of thousands of determinations, extending over 17 years, had shown that genuine milk had a freezing point not higher than -0.550° C., when determined by the method in use in the New Zealand Dominion Laboratory. If the freezing point rose to -0.530° C. watering might be suspected, and if to -0.520° C. the milk had certainly been adulterated with 5 per cent. of added water.

Acidity and Freezing Point of Milk

A paper entitled "Investigations on the Relations between the Acidity and Freezing Point of Milk" was read by A. J. Parker and L. S. Spackman. Determinations of the variations of the freezing points of milk with increasing acidities had been made on samples both unadulterated and containing definite amounts of added water. The value of 0·20 per cent. acidity, given by the "Connecticut Agricultural Experiment Station, 27th Report on Food Products (1922)" as the normal acidity of fresh milk, was criticised, and a value of 0·14 per cent. was suggested as being nearer the truth. The correction factor of 0.003° C. for each 0·01 per cent. excess acidity was shown to hold between acidities of 0·17 per cent. and 0·60 per cent., and a value of 0.010° C. had been suggested for acidities ranging from 0·14 to 0·17 per cent. lactic acid. Results with milks containing added water were tabulated, which tended to show that when the cryoscopic method was used for the determination of added water in milk, it could be applied with accuracy only when the samples were quite fresh.

International Oil, Chemical and Colour Exhibition

Notes on the Exhibits

To-day (Saturday) the International Oil, Chemical and Colour Trades Exhibition opens at the Royal Agricultural Hall, London, remaining open until Saturday, March 23. Below is given an account of the exhibits.

THE list of exhibitors is as follows:—Aldwych Engineering Co., London (air compressors and paint spraying machinery); Alfa Laval Co., Ltd., London (separators); Andrew and Suter, Ltd., London (measures); Morris Ashby, Ltd., London (zinc oxides, lithopone, blacks, zinc dust, etc.); Attwood's Spraying Equipments, Ltd., London (spraying equipment); Barker and Aspey, Hull (paint and machinery); F. S. Bayley Clanahan and Co., Manchester (degreasing machines); Benn Brothers, Ltd., London (THE CHEMICAL AGE and numerous other trade publications); Binney and Smith and Ashby, Ltd., London; S. Briggs and Co., Ltd., Burton-on-Trent (chemical and paint plant); British Ultramarine Manufacturing Co., Ltd., London (ultramarine blue); Thomas Broadbent and Sons, Ltd., Huddersfield (centrifugal machines and accessories); Buffoline Noiseless Gear Co., Ltd., London (grinding and blending mills, and various gears); Buhler Bros., London (mills for paint and ink, mixers); Burt, Boulton and Haywood, Ltd., London (paint mills); Bush, Beach and Gent, Ltd., London (chemicals); J. Harrison Carter, Ltd., Dunstable (grinding, crushing, sifting, and mixing machinery); Chemical Engineering and Wilton's Patent Furnace Co., Ltd., London (mixers, furnaces and chemical plant); Clifford Christopherson and Co., London (borax, boric acid, and other chemicals); Conquest Mill Engineering Co., Ltd., London (pulverising and grinding machinery); Dieny and Lucas, Ltd., London (distillation and rectification plant, chemical apparatus, and special paints); T. B. Ford, Ltd., High Wycombe (filter papers and pulps); Joseph Foster and Sons, Preston (mixers); Four Oaks Spraying Machine Co., Sutton Coldfield (spraying machines); Wm. Gardner and Sons (Gloucester), Ltd., Gloucester (sifting and mixing machinery).

Grant and West, Ltd., London (jointing material, aluminium solder, etc.); L. G. Hawkins and Co., Ltd., London (spraying apparatus, etc.); International Combustion, Ltd., London (Raymond roller mill); Jager and Sons, Ltd., Liverpool (measures); C. H. Joyce, Ltd., London; H. Keller and Co., London; Lang (London), Ltd., London; Langley Smith and Co., Ltd., London (oils, resins, lacquers); H. K. Lewis and Co., Ltd., London (scientific and technical books); M. H. Lummerzheim and Co., Ltd., Ghent (blacks); Marchant Bros., Ltd., London (mills, mixers, etc.); Geoffrey Martin and Taylor, Ltd., London (metafilters and porcelain ware); Metafilters, Ltd., Hounslow; L. A. Mitchell, Manchester (chemical plant); W. T. Nicholson and Clipper Co., Ltd., Manchester (belt fasteners and tools); Nordac, Ltd., Wealdstone (acid-resisting rubber linings, rubber concrete vats, etc.).

Oil and Colour Chemists' Association, London; Orr's Zinc White, Ltd., Widnes (lithopone, white barytes); Petri Bros., London (degreasing machines); Portable Pumps, Ltd., London; H. Reeve Angel and Co., Ltd., London (filter papers); Roberts Patent Filling Machine Co., Bolton (filling machines); Romac Motor Accessories, Ltd., Hendon; Sir W. S. Royse and Co., Ltd., Manchester (acid-resisting equipment); Sandeman Bros., Glasgow (rosin, oils, greases, soaps, etc.); Sandeman's Varnish, Ltd., Glasgow (varnishes, oils, ester resins and gums); Scott Greenwood and Son, London (trade publications); Scott Bader and Co., Ltd., London (collodion cotton, cellulose acetate, synthetic resins, titanium dioxide, pigments).

H. C. Slingsby, London (trucks, ladders, barrows); J. W. and T. A. Slingsby, London (colours); Sidney Smith and Blyth, Ltd. (paint, grinding, and mixing machinery); Society of Chemical Industry, London (journals and books); H. H. Stark, Ltd., London (trucks, trolleys and ladders); Steele and Cowlishaw, Stoke-on-Trent (pulverisers, mechanical sifters, etc.); Colin Stewart, Ltd., Winsford (silica, colours, wood fillers, polishing materials); Super Centrifugal Engineers, Ltd., London (clarifiers, centrifuges); Tanks and Drums, Ltd., Bradford (steel tanks and drums); The Tintometer, Ltd., Salisbury (tintometers); Torrance and Sons, Ltd., Bristol (paint machinery); Trocknungs-Anlagen-Gesellschaft, Berlin; Tungstone Accumulator Co., Ltd., London (accumulators); Thomas Tyrer and Co., Ltd., London (chemicals); Union Glue and Gelatine Co., Ltd., London; Archibald Vickers, Ltd., London (paints and varnishes); Dr. Alex. Wacker-Gesellschaft für Elektrochemische Industrie G.m.b.H., Munich (degreasing machines); Waide and Sons, Ltd., Leeds; Whiffen and Sons, Ltd., London (vermilion, fine colours and oils); Wicklow Ochre and Minerals Grinding Co., Ltd., Avoca, Ireland (pure natural classified yellow ochres); Woodhams Dade and Co., London; Young's Patent Hygienic Bin Co., London (sifters and mixers); Zipperling, Kessler and Co., Hamburg; Lacy Hulbert and Go., Ltd., Croydon.

Detailed notes on the exhibits appear below.

Carbons, Blacks, etc.

Carbon blacks suitable for all purposes are shown by Binney and Smith and Ashby, Ltd., of 17, Laurence Pountney Lane, London, E.C.4, who also show lamp and vegetable blacks; "Darco" (the L. Martin Co.'s decolorising carbon), a general purpose decolorising and deodorising carbon for the treatment of chemicals, oils, solvents, etc.; sulphur; and Ferrite Yellow (samples in three shades for the paint and linoleum ndustries).

Portable Electrical Spraying Equipment

L. G. Hawkins and Co., Ltd., of 30-35, Drury Lane, London, are exhibiting their new portable electric spraying equipment known as "Sprayit Electrically." There are two models, of which one has a coverage of 20 to 25 sq. ft. per minute, and the makers claim that the results are equivalent to those obtained with larger and more expensive spraying equipment. Continuous demonstrations are given.

Emulsifying Mills

Burt, Boulton and Haywood, Ltd., of Salisbury House, London Wall, E.C.2, exhibit various types of their Premier emulsifying mills, one of which is their latest development. The 5 in. laboratory type unit, fitted in Monel metal, will be in operation, and its applications have been directed towards the rapid and economical manufacture of certain paints, enamels and liquid suspensions of all kinds of pigments. There will also be exhibited the 5 in. paste mill. This unit is identical in principle with the Premier emulsifier, but has been so designed as to be particularly applicable in the treatment of the more viscous material. The company has extensive research laboratories at its Silvertown works, where all problems are handled by an efficient technical staff.

Zinc Oxides, Zinc Dust, etc.

Morris Ashby, Ltd., show a large range of samples of zinc oxides produced by the leading manufacturers of the world; samples of many grades of lithopone for linoleum, paints, varnishes, etc., depicting all the latest improvements; "Gilsonite," the purest natural asphaltum for varnishes, japans, blacks, wood stains, etc., this material as a basis being a great protector of ferrous metals and any material affected by weather; and samples of various metallic values.

Spraying Equipment

British-built spraying equipment for every spraying purpose is displayed at the exhibition by Attwood's Spraying Equipments, Ltd., of 76-80, Kensal Road, London, W.10. On the stand are shown complete equipments suitable for all trades, including portable painting equipments, air receivers and compressors, exhaust cabinets, ventilating fans, spraying guns (all types), and hand and power insecticide sprayers. Demonstrations are given at intervals. The company's "Spray while you pay" terms make the installation of a spraying plant possible without disturbing capital.

Fine White Silica

Colin Stewart, Ltd., of Winsford, Cheshire, who specialise in the manufacture of fine white silica for the paint, chemical and polishing trades, show the two classes of silica produced —crystalline, which is obtained from their quartz quarries in the Isle of Man, and amorphous silica, which is sold under the registered name of "Milowite," the raw material for which is of volcanic origin. This latter silica, in its raw state, consists of a mixture of soft lumps and impalpably fine powder,

and it is thus readily reduced to a degree of fineness which it is impossible to obtain from the ordinary crystalline variety. It is pure white in colour, and in extensive demand for all purposes where an inert material, of extremely fine texture, is called for. By means of levigation it is possible to guarantee that 90 per cent. of this material is below 0·01 mm. particle size.

"Milowite" can be used to great advantage as an extender, either in conjunction with, or in place of, barytes, and panels are shown to illustrate the results of its use as a reduction agent. Samples of crystalline and amorphous silica, in the raw condition and finished to various degrees of fineness, are exhibited, and also micrographs illustrating the difference in structure between the two varieties of silica.

Although the company's principal business is the production of fine white silica, they also manufacture several other registered products, such as "Abionite," a woodfiller, and "Silcanite," a material used in the dental profession for investment castings, etc. From their quartz quarries in the Isle of Man they obtain a pure white inert product which is sold as "Manx Spar" for decorative purposes in the building and monumental trades, for which purposes quartz is particularly suitable on account of its striking appearance and weather-resisting properties.

Grinding Mills, Disintegrators, and Crushers

The Buffoline Noiseless Gear Co., Ltd., of Manchester and London, who have for many years been the actual manufacturers of the well-known Kek mill, have recently acquired the sole licence for the sale of these mills. This company are exhibiting the following material: No. 3 size Kek grinding mill with internal parts exposed; No. 4 size Kek grinding mill in working condition; detail parts of various sizes of Kek mills; rotary table and shaker feeders; Marco four-screen disintegrators; and a tooth roll crusher. In addition to the above grinding plant, the following gears, which are a speciality of the company, are also shown: No. 10 vertical worm reducing gear box; spur reduction gear box; helical reduction gear; No. 9 inverted worm reducing gear box; raw hide pinions; and paper pinions.

Ultramarine

The British Ultramarine Manufacturing Co., Ltd., are exhibiting ultramarine blue of British manufacture throughout. Their works in London have since 1915 been brought quite up to date. Ultramarine, in addition to being used extensively by artists, and in all descriptions of decorative and industrial painting, enjoys a still wider field of application in such industries as calico printing, letterpress printing, wallpaper printing, lithography, finishing and bleaching, paper-making, sugar refining, soap making, laundry work, etc.

Mixers, Dryers, Mills, Etc.

At the stand of Wm. Gardner and Sons (Gloucester), Ltd., there are exhibited the following: The patent "Rapid" combined sifter and mixer, for all kinds of dry powders; the "Rapid" dryer for rapidly removing moisture from powders; Gardner's "Rapid" sifter, mixer and essence sprayer for adding liquids, essences, etc., to powders during mixing process; vertical and horizontal stone grinding mills; ball mills, metal, porcelain or silex lined; a machine for spraying and adding moistures to powders, etc.; roller grinding mills; Gardner's patent "Quick Change" dressing machine, with removable barrel for sifting fine or coarse grades; Gardner's "Rapid" grinder and sifter for grinding and sifting at one operation; Gardner's patent diaphragmic feeder for adding colours, improvers, etc., to the bulk; Gardner's new patent double agitator mixer for keeping lumpy materials, etc., in a granular condition; a wax shredding and granulating machine; and Gardner's patent combined fine powder dresser, mixer and sprayer for toilet powders, etc.

I.C.I. Shares in the United States

A LARGE block of Imperial Chemical Industries, Ltd., American deposit receipts of the Guaranty Trust Co. for the ordinary shares of £1 par value, were recently offered publicly by Colvin and Co., New York, at the United States market, at about $11.25 a share. It is stated in *Chemical Markets* that I.C.I. holds a large interest in the General Motors Corporation, as well as substantial holdings in the Allied Chemical and Dye Corporation, and E. I. du Pont de Nemours and Co., Inc.

Institute of Metals Coming-of-Age

Twenty-first Annual Meeting

AT the twenty-first annual general meeting of the Institute of Metals, held in London on Wednesday and Thursday, the president, Dr. W. Rosenhain, F.R.S., presented the report of the council for the past year. The report stated that the membership had passed the total of 2,000, having grown in twenty years from 355, the membership on December 31, 1908. An important development has been envisaged recently by the council. The proposal had been made that the Institute should co-operate in a scheme which had for its object the securing of a suitable site and building to accommodate a number of institutions and societies having somewhat similar aims, so as to secure economy by co-operation in certain services, and by the use of a common meeting-hall, library, and committee rooms.

The council had in hand arrangements for the next Autumn Meeting, to be held in Düsseldorf, Germany, from September 9–12, by the kind invitation of the Verein Deutscher Ingenieure and of the Deutsche Gesellschaft für Metallkunde. Steps were also being taken in connection with the visit of the Institute to America in 1932.

Holborn Explosion Inquest

THE inquest on Percy G. Thrower, aged 41, a G.P.O. linesman, who died from burns received in the Holborn explosion, was concluded on Monday. A verdict of accidental death was recorded. Mr. Ingleby Oddie, the Westminster coroner, who said that there were other issues far too serious for his court, and that no conclusions arrived at there would be decisive or final, found as follows: Thrower died from burns received at a time when an explosion of inflammable gases took place in a Post Office subway where Thrower was at work, and at a time when the gases were ignited by a petrol lighter lit by Thrower to enable him to find an electric plug in the dark subway to which he had, in the course of his duties, to attach a lead for an electric blower about to be used to ventilate the subway. Evidence was given of the finding of the lighter on the edge of a mound of debris. A labourer said that the lighter resembled one he had borrowed from Thrower. At the close of the evidence, Mr. Oddie said that with regard to the nature of the gas that ignited, evidence had been given by great experts, and he (Mr. Oddie) had followed it with great interest. He might say that he had definitely made up his mind what gas it was, but he was not going to say. He thought it would be impertinent for him to express his opinion in view of the fact that a Commission had sat. Whether it was coal gas, sewer gas, or petrol vapour would be decided afterwards by the Commission.

King Edward's Hospital Fund for London

A NEW series of specially-conducted tours is being arranged, under the auspices of King Edward's Hospital Fund for London, this year. The programme, which is not yet complete, will open with a visit to the Regent and Gerrard Telephone Exchanges on Saturday, March 23, at 2.30 p.m. The special feature on this occasion will be the reception of the party by the Assistant Controller of Telephone Exchanges, who will explain the working of the telephone system. The visitors will then be shown round the two exchanges, and afterwards entertained to tea on the premises. Tickets (price, 7s. 6d.) may be obtained from the Secretary, King Edward's Hospital Fund for London, 7, Walbrook, E.C.4.

Dominion Tar and Chemical: U.S. Issue

THE American press states that the Dominion Tar and Chemical Co., Ltd., has offered in New York and Canada a new issue of $4,000,000 6 per cent. sinking fund debentures, Series A, due 1949, at $100 and interest. The issuing company was organised recently to acquire the assets and business of the present company of the same name. It will own 84 per cent. of the stock of Canada Creosoting Co., Ltd., and 74 per cent. of the capital stock of Alexander Murray and Co., Ltd. The business of the old company has been in continuous operation for over twenty-five years and includes the distillation of tar and the sale of its by-products.

Overseas Chemical Trade in February

A Slight Check for the Month

ALTHOUGH the total statistics for the first two months of 1929 compare favourably with the first two months of 1928, there is a slight all-round restriction in the Board of Trade returns for February of the overseas trade in chemicals, drugs, dyes and colours. The imports amount to £1,149,640, a decrease of £1,302 as compared with February, 1928; the exports to £1,936,017, a decrease of £57,772; and the re-exports to £57,897, a decrease of £16,144. The detailed figures are given below :—

Imports

	Quantities Month ended February 28,		Value Month ended February 28,	
CHEMICAL MANUFACTURES AND PRODUCTS—	1928.	1929.	1928. £	1929. £
Acid Acetic .....tons	1,307	1,420	56,994	56,161
Acid Tartaric.....cwt.	3,217	2,693	18,143	18,187
Bleaching Materials ,,	10,916	11,267	8,603	11,381
Borax ..... ,,	13,330	5,467	11,224	3,802
Calcium Carbide ... ,,	52,032	57,052	31,023	35,209
Coal Tar Products Value	—	—	6,838	1,229
Glycerin Crude ....cwt.	144	462	450	923
Glycerin Distilled .. ,,	398	840	1,382	2,178
Red Lead and Orange Lead..... ,,	3,741	3,232	6,144	4,606
Nickel Oxide ..... ,,	—	—	—	—
Potassium Nitrate . ,,	10,686	10,453	11,023	10,508
All other potassium Compounds ..... ,,	280,973	290,309	86,672	76,666
Sodium Nitrate .... ,,	104,941	286,630	50,894	139,945
All other sodium compounds ..... ,,	38,313	26,662	22,922	19,622
Tartar, Cream of ... ,,	3,054	3,457	13,157	16,382
Zinc Oxide .....tons	925	896	29,525	25,752
All other Sorts ...Value	—	—	258,324	246,064
DRUGS, MEDICINES, ETC.				
Quinine and Quinine Salts ..... oz	156,325	91,155	12,042	7,108
Bark Cinchona ....cwt.	90	887	384	3,479
Other Sorts .....Value	—	—	135,159	180,803
DYES AND DYESTUFFS, ETC.—				
Intermediate Coal Tar Products .....cwt.	46	62	458	970
Alizarine .....cwt.	107	154	2,667	5,122
Indigo, Synthetic .. ,,	—	—	—	—
Other Sorts ..... ,,	3,051	3,339	70,347	72,527
Cutch ..... ,,	4,096	3,255	6,088	4,703
All other Sorts .... ,,	1,769	2,922	7,324	8,315
Indigo, Natural	135	31	4,037	711
Extracts for Tanning ,,	143,950	51,361	164,708	52,646
PAINTERS' COLOURS AND MATERIALS—				
Barytes, ground, and Blanc Fixe ..... cwt.	72,413	38,967	16,159	8,384
White Lead (dry)... ,,	10,785	12,150	15,794	20,183
All other Sorts .... ,,	72,618	85,216	102,457	116,074
Total of Chemicals, Drugs, Dyes, and Colours.....Value	—	—	1,150,942	1,149,640

Exports

CHEMICAL MANUFACTURES AND PRODUCTS—				
Acid Sulphuric ....cwt.	1,936	2,084	2,267	2,744
Acid Tartaric ..... ,,	2,203	1,078	13,886	8,050
Ammonium Chloride tons	318	459	7,621	8,214
Ammonium Sulphate—				
To Spain and Canaries tons	1,159	8,598	11,739	86,258
,, Italy ..... ,,	578	201	5,702	1,900
,, Dutch East Indies tons	5,111	2,549	53,256	26,757
,, Japan	7,480	12,276	76,643	126,699
,, British West India Islands and British Guiana tons	560	631	5,704	6,425
,, Other Countries ,,	11,311	12,926	116,663	131,724
Total ..... ,,	26,199	37,181	269,707	379,763

	Quantities Month ended February 28		Value Month ended February 28	
	1928.	1929.	1928. £	1929. £
Bleaching Powder ... cwt.	40,442	52,689	15,439	14,648
COAL TAR PRODUCTS—				
Anthracene .....cwt.	—	—	—	—
Benzol and Toluol . gal.	590	904,127	53	67,741
Carbolic Acid .... cwt.	22,901	18,294	41,301	29,651
Naphtha.....gall.	3,619	4,743	346	454
Naphthalene .....cwt.	855	6,602	651	2,971
Tar Oil, Creosote Oil, etc. .....gall.	2,862,657	66,502	104,052	4,039
Other Sorts .....cwt.	67,987	9,530	31,099	8,276
Total .....Value	—	—	177,502	113,132
Copper, Sulphate of ..tons	5,546	5,779	126,969	137,373
Disinfectants, Insecticides, etc. .....cwt.	42,330	28,710	98,427	69,600
Glycerin Crude .....cwt.	2,549	11,486	8,003	14,620
Glycerin Distilled..... ,,	15,549	7,714	62,743	25,110
Total ..... ,,	18,098	19,200	70,746	39,730
POTASSIUM COMPOUNDS—				
Potassium Chromate and Bi-Chromate ....cwt.	2,559	1,101	4,525	2,20
Potassium Nitrate (Saltpetre) .....cwt.	1,513	998	2,857	1,877
All other Sorts .... ,,	1,252	2,957	11,923	10,93[illegible]
Total ..... ,,	5,324	5,056	19,305	15,023
SODIUM COMPOUNDS—				
Sodium Carbonate, including Soda Crystals, Soda Ash and Bi-carbonate .....cwt.	462,565	344,256	126,689	100,348
Soda Caustic ..... ,,	167,911	145,123	106,784	95,241
Sodium Chromate and Bi-chromate .... cwt.	3,143	3,641	4,204	5,641
Sodium Sulphate, including Salt Cake ... cwt.	13,074	64,012	1,993	7,439
All other Sorts .... ,,	52,306	48,339	62,684	47,214
Total ..... ,,	698,999	605,371	302,354	255,883
Zinc Oxide ..... tons	85	177	3,062	5,807
Chemical Manufactures, etc. all other Sorts ...Value	—	—	275,276	247,525
Total of Chemical Manufactures and Products (other than Drugs and Dyestuffs) .....Value	—	—	1,382,561	1,297,582
DRUGS, MEDICINES, ETC.—				
Quinine and Quinine Salts .....oz.	206,930	151,540	20,351	13,045
All other Sorts ...Value	—	—	213,363	225,485
Total ..... ,,	—	—	233,714	238,530
DYES AND DYESTUFFS—				
Products of Coal Tar cwt.	7,586	13,297	62,709	75,834
Other Sorts ..... ,,	7,314	4,799	6,289	6,141
	14,900	18,096	68,998	81,975
PAINTERS' COLOURS AND MATERIALS—				
Barytes, ground, and Blanc Fixe ..... cwt.	167	1,849	179	885
White Lead (dry)... ,,	3,818	2,821	7,334	5,810
Paints and Colours in paste form ..... cwt.	48,064	40,927	95,314	79,482
Paints and Enamels Prepared (including Ready Mixed) .....cwt.	35,034	46,062	114,205	139,716
All other Sorts ..... ,,	47,808	48,963	91,484	92,037
Total ..... ,,	134,891	140,622	308,516	317,930
Total of Chemicals, Drugs, Dyes and Colours .....Value	—	—	1,993,789	1,936,017

Re-Exports

	Quantities Month ended February 28		Quantities Month ended February 28	
	1928.	1929.	1928. £	1929. £
CHEMICAL MANUFACTURES AND PRODUCTS—				
Acid Tartaric ..... cwt.	65	115	515	960
Borax..... ,,	77	—	71	—
Coal Car Products. Value	—	—	3,640	36
Potassium Nitrate . cwt.	98	69	165	103
Sodium Nitrate .... ,,	4,576	390	2,445	239
Tartar, Cream of ... ,,	583	481	2,828	2,354
All other Sorts ...Value	—	—	18,273	14,211
DRUGS, MEDICINES, ETC.—				
Quinine and Quinine Salts .....oz.	15,657	34,244	1,632	3,452
Bark Cinchona ....cwt.	92	38	318	176
All other Sorts ...Value	—	—	31,992	28,247
DYES AND DYESTUFFS—				
Cutch .....cwt.	1,973	938	3,193	1,419
Other Dyeing Extracts cwt.	175	47	1,084	815
Indigo, Natural .... ,,	13	3	394	70
Extracts for Tanning (solid or liquid) ..cwt.	750	741	1,047	897
PAINTERS' COLOURS AND MATERIALS.....cwt.	2,517	6,891	5,438	4,970
Total of Chemicals, Drugs, Dyes and Colours .....Value	—	—	74,131	57,987

British Chemical Standards

Report on Fourth Period of Working

THE organisers have just issued a pamphlet (pp. 46) containing the "Report of the Fourth Three Years' Working of the British Chemical Standard Movement," which was presented at the General Meeting at York, on January 11, and shows very decided progress during the period. It may be recalled that this movement, which is carried on entirely by the voluntary work of co-operators—now over 90—in this and other countries, has for its object the coordination of analytical work, thus giving a definite known value of the results of all chemists who control their work by these standards. The advantage of this, both technically and commercially, is being realised more and more by engineers, manufacturers and purchasers of material generally, as well as by independent chemists.

Already these standards, both ferrous and non-ferrous, are being used by some 850 laboratories of which nearly 70 are overseas, and comprise a very wide range of types of users, both public and private, including a large number of Universities and other educational establishments, whilst the quantity of material controlled runs into millions of tons.

A new and useful feature of this publication, rendered desirable by the international character of the work, is the inclusion of some explanatory remarks for those "who have not seen the earlier reports and may, therefore, want to know something about the movement generally," printed in French, Italian, Spanish, Polish, and English. After reading this, even those who do not readily read English will more easily be able to follow the other matter, much of which consists of tables. There are also included brief epitomes of the three previous Three Year Reports. Copies of the pamphlet may be obtained from the organisers, 3, Wilson Street, Middlesbrough.

Bradford Dyers' Association Claim

OWING to the illness of an indispensable witness for the defendants, Herr Liebmann, the Anglo-German Mixed Arbitral Tribunal, sitting in London on Friday, March 8, adjourned the hearing of a claim involving over £70,000, made by the Bradford Dyers' Association against the German Government. The claim was in respect of moneys, the value of shares, which the Association held in the firm of S. H. Sharpe and Sons, G.m.b.H., of Kingersheim, Alsace, and other items, left to the Tribunal to assess, arising, it was alleged, out of the German Government's "exceptional war measures." The money was invested in German War Loan by the compulsory administrator. An interlocutory decision was given by the Tribunal in June of last year.

Painting Cement and Plaster

An Interesting Joint Discussion

A JOINT meeting of the Oil and Colour Chemists' Association and the Incorporated Institute of British Decorators was held at the Painters' Hall, London, on Thursday, March 7. The subject for discussion was "The Painting of Plaster and Cement—Old and New: (1) By Nitro Cellulose Methods; (2) By Oil Painting Methods."

Mr. A. D. Cowper, of the Building Research Station, opening the discussion, drew attention to a number of points in connection with the problem of painting with oil paints over plaster and cement.

Nitrocellulose Paint on Plaster

Mr. H. W. G. Bidgood (Imperial Chemical Industries, Ltd.), speaking with regard to nitrocellulose painting on plaster, said he thought he was right in saying that investigatory work on this subject had hung behind similar work in many other directions where nitrocellulose had been very successfully employed, and the reason was that until quite recently it had been difficult to apply nitrocellulose by means of a brush and to obtain a finished result which looked like a really painted job and not a botched-up affair. The trials carried out by the firm with which he was associated had up to the present shown that where nitrocellulose was to be employed for decoration work in the interior of buildings, it was desirable to use an undercoat of an oil type on the plaster surface before applying the nitrocellulose. It had been found indeed that an oil undercoat was a desideratum. The actual type of undercoat which had been found most satisfactory was one composed of a China wood oil composition.

Spraying Methods

Hitherto the fact that nitrocellulose paints could only be applied by spraying had introduced difficulties and limitations. It was, however, fair to mention in regard to spraying that there had been developed quite recently some rather clever sprays, which were based on an ingenious principle. In these, the cone formed by the atomising air was itself confined in a cylinder of air, i.e., not only did atomisation take place at the nozzle tip, but the cone so formed was kept within decent limits by means of a surrounding cylinder of air produced by a number of holes round the circle, just outside the atomising tip.

As regards applying nitrocellulose paints and enamels with a brush, he could state with confidence that this was now a perfectly practical proposition; and, compared with this time last year, outstanding advances had been made in the production of brushing nitrocellulose enamels.

Mr. Langton (Lewis Berger and Sons, Ltd.), mentioned several instances in which cellulose painting had stood up quite well on plaster wall. With regard to an oil undercoating, he disagreed entirely with Mr. Bidgood, and said that an oil undercoating, in his experience, was absolutely fatal for the subsequent application of nitrocellulose paints.

Mr. Heaton's Views

Mr. Noel Heaton said that for years it had been his strong opinion that painting in oil was the worst possible treatment for the decoration of plaster, but in recent years he had come to the conclusion that possibly there was one worse method, and that was the use of nitrocellulose. That summed up his view in a few words, and he was afraid it was a hopelessly destructive attitude. To put the thing on a more constructive basis, however, he would like to suggest that the real and final solution of the problem was to find a non-organic binder for the pigments. If it were possible to fix pigments with a binder which was entirely inert to alkali in the first place, and yet would form a film which was fairly porous, this would overcome the greatest difficulty of all, the effect of moisture getting access to the plaster either from the outside or the inside and disrupting the coat of paint, which was the cause of a great many failures.

Dr. New, speaking on behalf of the Paint and Varnish Research Association, said that everybody seemed to think that paint must be entirely altered to suit the plaster, but few people seemed to take the view that plaster might be altered to suit the paint. It was quite obvious that a good many plasters had excess lime, which, he gathered from the discussion last year, was put in to give the plaster certain definite physical properties, but why could not some inert substance be used instead?

Basic Industrial Minerals: No. V—Gypsum

By G. Malcolm Dyson, Ph.D., A.I.C.

THE extent to which gypsum and its products are used in industry is shown by the following figures, which represent the production of this mineral in the year 1920 :—

SOURCE.	TONS.
United Kingdom	291,598
India	34,091
Canada	389,319
United States	3,129,142
Australia	40,192
France	2,078,482

The mineral gypsum is a hydrated calcium sulphate of the formula $CaSO_4 2H_2O$. Various forms of this hydrate are known. The large crystalline form is known as selenite, and occurs in the form shown in Fig. 1, the second form being

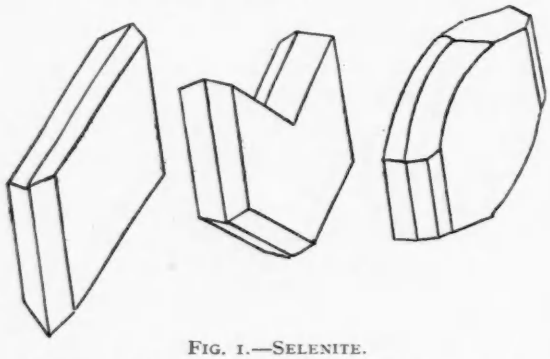


FIG. 1.—SELENITE.

obtained by twinning the first. Alabaster is a form of gypsum in a hard compact state, while of gypsum proper there are two main varieties: the fibrous form (often known as "satin-spar") and the normal type. The fibrous type of gypsum lies over the variegated sandstone and characterises that formation. It is translucent, very soft and often of a grey or red colour in place of the more usual white. The compact type is often of an ash-grey colour, and lies over the oldest floëtz limestone; it has an even fracture, occasionally splintery, and is very soft. In addition, there are a few small deposits of gypsum earth, which is usually found in the cavities of the other types, where it appears to have been formed by the deposition of gypsum from aqueous solutions which have percolated through the upper beds.

Anhydrite

Since anhydrite is a dehydrated form of calcium sulphate, it may well be considered at this point. The mineral was first noticed by the Abbé Poda, who gave it the name of "muriacite," since he was under the impression that it was a combination of lime and muriatic acid. Klaproth gave a correct analysis of it, but it was only after the mineralogist Haüy described it in his well-known treatise that it was generally recognised as a separate mineral. Since that time it has been discovered in many localities. Anhydrite occurs in four varieties: the compact form (which often occurs coloured, massive and translucent), and the foliated, scaly and cube crystal forms. For many purposes, such as the manufacture of plasters and cements, anhydrite cannot replace gypsum, but in the many cases where calcium sulphate is required for chemical purposes anhydrite can be utilised. Thus, in the manufacture of sulphate of ammonia from synthetic ammonia the sulphuric radicle is more often than not derived from anhydrite. The chemical reaction which lies at the basis of this process is :—

$$2NH_3 + CO_2 + H_2O + CaSO_4 = (NH_4)_2SO_4 + CaCO_3$$

The anhydrite is finely ground and treated with an aqueous solution of ammonia and carbon dioxide under pressure. Curiously enough, the same reaction is at the basis of the well-known custom of sprinkling the floors of cowhouses with plaster in order to fix the volatile ammonia of the manure.

Before gypsum can be used it has to undergo the process of calcination, in which all or part of its water of crystallisation is removed, according to the temperature used and the purpose for which the final product is designed. There are two varieties of commercial gypsum (although, of course, each variety can be obtained in several different qualities); the stucco variety, which contains about half a molecular proportion of water of crystallisation and is the rapidly setting (First Settle) plaster, and a variety from which the water has been almost completely removed at a temperature of 870–970° C. This latter form is often known as "floor gypsum," since it is used for the manufacture of slow-setting flooring compositions.

The Calcination of Gypsum

There are two main methods for the production of stucco gypsum; the older of these, known as "boiling," is a comparatively primitive operation, although requiring a considerable measure of skill. The raw material (gypsum) is ground to a fine powder and heated to a temperature of 160–185° C. in a cast iron boiler. As the heat disengages the moisture, the powder is thrown into a state of agitation which resembles in some ways the boiling of a fluid, and this phenomenon gives rise to the name of the process. During boiling the powder is constantly stirred mechanically, since the overheating of any part leads to "dead-burning," i.e., complete removal of the water of crystallisation, in which case the setting power of the final product is diminished.

The boiling process has many disadvantages. In the first place it cannot be made continuous, and much time and fuel are wasted in the alternate charge and discharge of the boilers. Further, a large amount of heat is wasted, since it is always a costly process to heat a powdered substance indirectly through the material of the boiler. Lastly, gypsum is more difficult to grind when containing its water of crystallisation than after calcination, so that much more power is required in the mill-house when boiling methods are practised. Consequently, rotary automatic kilns have been devised for the drying of gypsum, which operate on a very much smaller power and fuel consumption. In construction, these kilns resemble a very slightly sloping rotary shaft furnace. The raw material is fed into one end of the drum by a screw feed, and need only be crushed, prior to calcination, to the size of hazel-nuts. The body of the furnace is constructed on the Büttner principle (see Fig. 2), in which the cylinder is filled

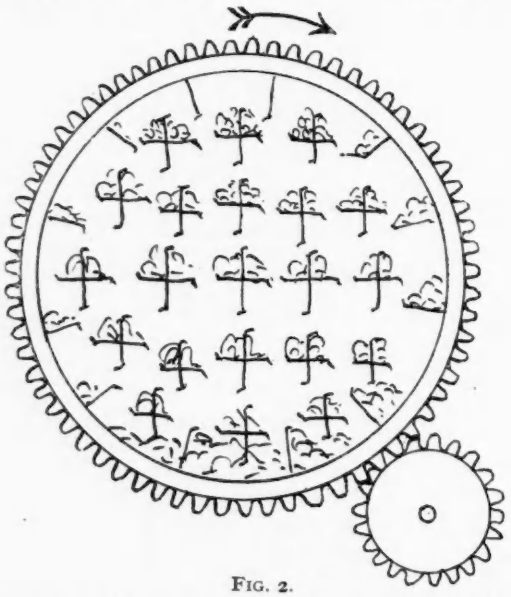


FIG. 2.

with a system of longitudinal cross-shaped distributing plates, capable of not only distributing the charge and exposing it evenly to the hot gases which pass through the furnace, but also of balancing the charge in the furnace and making it easy to rotate.

A cross section of the furnace is shown in Fig. 2. The passage of the material through the furnace is brought about partly by the aid of gravity and the rotation of the drum, but mainly by a suction fan placed at the exit end of the furnace. This means that the hot gases are passing through the furnace in the same direction as the material to be heated. In general this is not a plan to be recommended, but in the case of this calcination the usual objections cannot be sustained as the temperature involved is only comparatively low.

Very slight consideration will show the very real advantages to be attained by the use of this process; it is continuous, does not involve a preliminary grinding of the raw material, can be automatically regulated as to temperature, requires the minimum of skilled superintendence, and above all it effects a cut in the amount of fuel employed of between 30–50 per cent. The "boiling" process requires between 8,800 and 10,000 B.T.U.'s to effect the removal of a pound of water; by the rotary kiln method only 6,000 B.T.U.'s are required. Such a saving very soon balances the expenditure of capital required for the setting up of such an installation. One feature of the plant is of interest: namely, that the fan device for maintaining the progress of material through the furnace has the additional merit of sucking out the dust. This is collected in the usual type of dust collector and constitutes the "No. 1" grade of modelling plaster, which is a valuable product available for immediate sale. The plaster as it leaves the furnace required only a very slight grinding, followed by screening, to prepare it for dispatch. It is also important that a preliminary screening of the raw material takes place before feeding to the furnace. This is merely to ensure a uniform product.

The Uses of Gypsum

The uses of gypsum and plaster of Paris in the arts and industries are so manifold that it is almost impossible to attempt a complete account of their applications. The setting power of plaster renders it invaluable for the manufacture of moulds for pottery, of composition boards, quick setting plasters, etc., but by far the largest amounts of gypsum and plaster are used in the manufacture of Portland cement, in which it plays the part of an "inhibitor," retarding the setting of the mixture. About ½ per cent. is the usual amount of addition, depending on the exact nature of the cement used. There are two ways in which the inhibitor may be added; either to the clinker before grinding, as gypsum, or as plaster to the ground material. For this purpose anhydrite is of no use, owing to its comparative insolubility in water. The function of the plaster appears to be concerned intimately with the solubility of the calcium sulphate in water. This property is shown graphically in Fig. 3, from which it

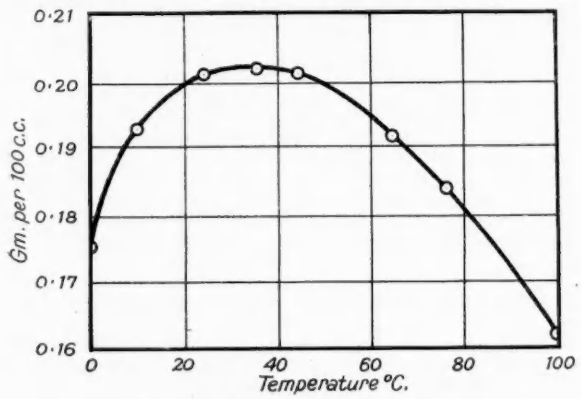


FIG. 3.—SOLUBILITY OF GYPSUM.

will be seen that the solubility rises as the temperature rises only up to a certain point, after which it decreases. The figures were obtained by Hulett and Allen on a sample of natural gypsum.

The agricultural uses of gypsum again depend on the slow solubility of the mineral in water. It is much used in hopfields. Chemically, its action depends on the fact that it accelerates the decomposition of zeolites, and breaks down the double silicates of magnesium and potassium. It retains and even absorbs moisture, and is in some measure capable of protecting crops from drought. Its effect on crops is readily demonstrated from the Australian Government Experiments (Agriculture) data. Ground which was untreated gave a yield of 9 bushels per unit; with 100 lb. of superphosphate the yield rose to 15·1 bushels; with 1½ tons of gypsum and the above amount of superphosphate the yield rose to 25·6 bushels.

Other uses of gypsum are in the paint and decorating trade, as a basis for the striking of lakes, and in the preparation of brewery water. Thus, the celebrated Burton water contains 78 grains of calcium sulphate to the gallon; attempts are made to reproduce this water artificially by the addition of calcium sulphate.

Colloidal Content of Clays

Study of Grain Size Distribution

INCLUDED in the programme of the China Clay investigation of the United States Bureau of Standards is a study of grain size distribution. While this has been carried out by the sedimentation process and application of Stokes's law down to a particle size diameter of 1·7 microns, the data indicated that from 35 to 60 per cent. of the total clay had a grain size of less than 1·7 microns. Since this large quantity of finely divided material undoubtedly has a pronounced effect upon the properties of the clay, it seemed desirable to make a further classification as regards size.

After reviewing the literature and studying the methods of various investigators, it was decided that centrifuging was the best way to effect the separation. Hand and motor driven centrifuges were tried, but the speed was insufficient, and a Sharples laboratory super-centrifuge was obtained. It was found that for a suspension of specific gravity 1·6 and a range of flow of 20 litres per hour, the centrifuge would throw out of suspension all particles greater than one micron in diameter when rotating at 12,000 r.p.m.

The particle size was checked with a microscope using a 12·5 micrometer eyepiece and an oil immersion objective. The second separation consisted in taking the suspension from the first and centrifuging it at a speed of 18,000 r.p.m. and a rate of flow of about 8 litres per hour. This material remaining in suspension after the second separation was removed either by centrifuging at 40,000 r.p.m. and a very slow rate of flow, or running through a set of Pasteur-Chamberland filters. The ultra filters have a slight advantage over the centrifuge in that they remove every particle of suspended matter while the centrifuge leaves a trace in suspension.

Adsorption of Water

The Bureau of Chemistry and Soils has done considerable work on the estimation of colloidal material by obtaining the adsorption of water or other liquids, by the clay and by a sample of the total colloid. The adsorption in grams per gram of the total clay divided by the corresponding value for the total colloid gives the percentage of colloid. This method will be used to estimate the total colloid present in the clays. The figure obtained should check roughly the amount indicated in the earlier work as being under 1·7 microns.

Then, to go farther, it is desired to compare the quantities of material obtained from the second and final extractions of any one clay with like quantities from any other clay. If the same volume and the same concentration of suspension are used for the various clays, then, under similar conditions of centrifuging, the actual amounts of material thrown out at any one speed should be relative and comparable. The separated material can be carefully removed, dried, and weighed.

Thus far data have been collected on a few clays only, but it is expected that considerable difference between one clay and another will be shown in the quantities of these fractions.

China Clay Imports—February, 1929

A RETURN showing the quantities and value of China Clay, including China Stone, imported into Great Britain and Northern Ireland as registered in the month of February, 1929, is as follows:—

COUNTRY WHENCE CONSIGNED.	QUANTITY. Tons.	VALUE £
Germany and total	1	4

The Fastness to Light of Lake Colours

A Paper Before the Oil and Colour Chemists

A paper on "The Fastness to Light of Lake Colours" was delivered by Mr. S. T. Kinsman before a well-attended meeting of the Manchester Section of the Oil and Colour Chemists' Association, held at the Milton Hall, Manchester, on Friday, March 8, Mr. T. H. Bridge, chairman of the section, presiding.

MR. KINSMAN explained that some three years ago the Colour Makers' Association commenced an investigation of the fastness to light properties of lake colours, and he was a member of the sub-committee formed to carry out this work. During the period of their experiments it became more and more evident that the study of the property in question had been badly neglected, and some extraordinary results were obtained from certain colours. In the past the fastness of a large number of lakes had been taken for granted, the classification being based on the fastness of the dyestuff from which they were derived, whole groups of dyestuffs being grouped together as being of similar fastness to light. The question was sometimes put, "How was it that lake makers were unable to guarantee their products in the same way that textile dyers did?" The chief reason was that lake makers did not know how their colours were going to be used. Another reason was that, generally speaking, dyestuffs were faster to light on the fibre than they were in the form of a lake. There was still another reason, and that was that there were few dyestuffs which were guaranteed by the textile user which were of use to the lake maker. In this connection he referred particularly to the vat colours, which had a very limited use for lakes, and these formed the bulk of the guaranteeable textile colours.

Method of Testing Needed

If a standard method of testing lake colours could be set up, even if only for the time being, it should eventually lead to some order being effected out of the tangle which undoubtedly existed at the present time. There were no recognised standards of light fastness of lakes in this country, whilst there was at least an arbitrary scheme in use on the Continent.

All lakes, said Mr. Kinsman, changed under the influence of daylight, whether in the dry form or when rubbed out in a medium. Much trouble was caused through confusing the light fastness of a colour with its fastness or otherwise to chemical action. In considering the probable durability of a lake the effect of various reagents should be taken as separate factors. Even the effect of the medium, where it exerted no chemical influence, should be taken as a separate factor in reference to durability.

The optical changes which took place when a lake faded could be said to proceed in two main ways. The change was usually evident along all sides of the colour triangle, the fading proceeding until a point of greyness was reached. In other cases, a darkening took place at the beginning and disappeared towards the end of the fading. As the fading and darkening proceeded there occurred changes in the degree of selective light absorption, which later discontinued in favour of increased reflection or absorption. The cause of the change was due to light of all wave-lengths of the visible and invisible spectra, for, although ultra-violet light in general produced an especially powerful effect, the change due to light was not limited to the effect of the rays of short wave-lengths; there were certain colours which changed more slowly in ultra-violet light than they did in sunlight.

Reason for Fading of Lakes

Generally speaking, said the author, the fading of lake colours was due to the decomposition of the dyestuff constituent by oxidation or reduction or both. Generally speaking, also, the more chemically stable the salt of a dyestuff was the faster to light the lake would be, in its particular class, of course. For example, all the latest work on the improvement in the fastness to light of basic and acid dyestuffs depended on this fact. Basic and acid dyes became faster to light by the formation of stable complex combinations. Acid dyes which contained amino groups became likewise faster to light when not only the sulphonic acid groups but also the amino groups were fixed in laking. The alkali salts of the almost insoluble pigment dyestuffs of the Lithol Red type were less stable than the barium and calcium salts. In stating the fastness of a lake it was far too common practice to give it the fastness of the dyestuff from which it was produced. This was particularly bad, and every lake should be tested on its merits before anything was said on this particular property.

The effect of various media on a lake was of great importance. It was often said that a colour was faster in one medium than in another. Apart from any chemical effect this discrepancy in fastness was only apparent, and usually due to the difference in the actual amount of colour it was possible to expose in such a medium. There were two main types of effect due to the medium, a surface effect and a depth effect. When a water paint or distemper colour was faded, the colour was destroyed on the surface only, and by carefully rubbing off this faded layer the original colour could be restored, and with the usual distemper coating this operation could be repeated several times, so that the fading was only superficial. This was known as a surface effect.

On the other hand, if a lake was rubbed out in varnish and exposed, the effective light would penetrate more deeply into the pigment, so that more than the surface layer was faded. This was known as a depth of optical bridge effect, and with increase in the difference or refraction the influence of the medium increased and there would be an increase in the fastness to light with increase in the thickness of the filtering layer. There was still another part played by a medium, in the superficial coating of a lake with a medium such as varnish, for instance. When light passed through a transparent medium of low to a transparent medium of high refractive index, part of the light was transmitted and part reflected, and, generally speaking, the greater the difference between the refractive indices of the two media the more light would be refracted at the interfaces and the less transmitted, or, in the case of pigments, absorbed. This effect of coating with a clear medium could be looked upon as subsidiary to the depth effect, which it increased.

It would be seen that if one could succeed in producing a layer of such thinness as not to exceed the depth of the light effect on the colour, one and the same colour would then prove to be of similar fastness to light in all media, and it was on such a basis that lakes should be classified.

There was no doubt that standards of fastness to light could only be determined on a graphical basis, but it first became necessary to create standard methods of testing, and from these a practical classification could be made. To this end various experiemnts were carried out.

A Basis of Classification

As regards the classification of the results, the general consensus of opinion was that five classes were sufficient, No. 1 being taken as the most permanent. For the present, the five classes would be defined as follows: (1) No perceptible alteration after one month's exposure—June, July, or August; (2) a slight loss in depth or alteration in shade after one month's exposure; (3) a distinct loss in depth or alteration of shade after one month's exposure; (4) a distinct loss in depth or alteration of shade after fourteen days' exposure; and (5) colour practically bleached out after one week's exposure.

In these days of speed, however, one could not wait a month or until the summer months to ascertain the comparative fastness of a lake, so that an attempt must be made to reproduce the fading of colours by artificial light. A few experiments with a mercury vapour lamp confirmed the idea that this apparatus was unsuitable for the purpose. Artificial fading of prints was, therefore, carried out by means of a carbon arc lamp. The results were rather disappointing.

Standard Lakes

The suggestion was made to take lakes of the following to represent the five classes of fastness to light: No. 1, Alizarine Red alumina calcium phosphate lake; No. 2, Permanent Red 4B calcium salt; No. 3, Lithol Red R barium salt; No. 4, Eosine Y.S. lead salt, barium sulphate base; and No. 5, Fastness less than that of Eosine. It must be emphasised that each member of the five classes was the lowest of its class.

Artificial Silk Production

Effects of Its Growth on Chemical Industry

REVIEWING the effects on the chemical industry of the artificial silk industry during 1928, a writer in the current issue of the *Artificial Silk World* states that although it was early recognised that the artificial silk industry would have far-reaching effects upon the employment of chemists and skilled workers, it is only now that one is able to appreciate the consequences of its growth upon the chemical industry.

Increased Demand for Sulphuric Acid

In reviewing the progress of the latter industry during 1928 one is struck repeatedly by these consequences, both in regard to output and to technique, of the increased demand for its products by the newer industries and especially the artificial silk industry. For the twelve months ending September 30, 1928, (later figures are not yet available), the output of 100 per cent. sulphuric acid was 908,000 tons as compared with 846,000 tons in the same period of 1927. A large part of this increase is directly attributable to the increased production of viscose silk during the same period. The consequences of such a demand, however, are not likely to affect the price of the acid for some years to come (the price has remained steady at £3 per ton for 144° Tw. and £5 10s. for 168° Tw. during the year), since the sulphuric acid works are still operating at only about two-thirds of their productive capacity. The demand by the artificial silk and other post-war industries has, however, affected the acid industry in another respect, for whereas formerly the acid maker could dispose of a relatively impure and low strength acid (such as "chamber strength" acid) to his principal customer, the fertiliser manufacturer, to-day the demand for such acid is negligible. His new customers require a pure and high strength acid. This change in the demand has necessitated the use of other and somewhat more expensive raw materials (American sulphur is replacing to an increasing extent native and imported pyrites as a source of the necessary sulphur). It has also brought into more general operation the newer processes of manufacture and increased the manufacture of oleum.

The Acetone Position

Acetone, continues the above writer, has shown a sharp contradistinction. Opening 1928 with an increase of £4 per ton, there was a further increase of £1 in April and another of over £10 in September. The price is now £76 10s. to £85 per ton, with the prospect of a possible further increase. The supply of this commodity presents an interesting economic problem of world-wide dimensions. The import figures of the past few years are as follows:—1924, 1,532 tons; 1925, 1,468 tons; 1926, 1,998 tons; 1927, 2,500 tons (the 1928 figures are not yet available).

Retirement of Dr. Longstaff

Proposed Testimonial from Members

The following letter has been circulated among members of the Society of Chemical Industry by Dr. A. D. Little, the president:—

"As you are doubtless aware, Dr. Longstaff is retiring from the position of general secretary on March 31 of this year, after twelve years of loyal and efficient service to the Society. The Council, being of opinion that members would wish to place on record their appreciation of his work, suggest that it could not be better expressed than in the form of a testimonial to which every member may have an opportunity of subscribing. The amount of the subscription is, of course, a matter for the individual member, but since the number of members who subscribe is at least as important and will give just as much pleasure to Dr. Longstaff as the sum collected, the amount of 5s. has been proposed, but all subscriptions, however small, will be welcomed, and if members desire to exceed this sum larger contributions will be received with appreciation. In these circumstances the Council feel sure that every member will be quite willing to subscribe, and the honorary treasurer, Mr. H. T. F. Rhodes, 35, Onslow Road, Richmond, to whom cheques and postal orders crossed 'Dr. Longstaff's testimonial' should be made payable, will be pleased to receive your contribution at an early date."

Damages for Breach of Agreement

Successful Claim by Chemical Manager

A CHEMICAL manager, Mr. Sam Rothera, was awarded £300 damages against Duthie and Sons, chemical manufacturers, Westfield Works, Heckmondwike, for breach of an employment agreement, at Leeds Assizes, on Friday, March 8.

The plaintiff's case was that he was engaged in November 1924 by the defendants, on a five years' agreement, as manager of their new dry soaps and blue department. His salary was to be £4 4s. per week, with some share of profits or an increase of salary if the department progressed satisfactorily. In November, 1926, however, he was told by Mr. Colin Duthie, one of the partners, that the firm was suffering financially, and he was asked whether he would consider a reduction in wages until the firm became more prosperous.

The plaintiff agreed to a reduction of £1 per week, but only as a temporary measure. Matters thus continued until June, 1927, when trade became very bad, and the plaintiff was put on short time, working three days a week, and the defendants paying him only for the period worked. In October, 1927, the plaintiff was told that there was no work for him, and he would have to finish, at least for the time being, but if trade improved they would send for him and he could start again. After that he called repeatedly, but was told there was no work. He "signed on" at the employment exchange, and, if he was successful in that action, he would, of course, have to repay to the authorities the amount he had drawn.

Mr. Colin Duthie, giving evidence, said it was the plaintiff himself who, "a time or two," suggested that his wage should be reduced.

The Judge: You seem to have been quite difficult to persuade. This is a very unusual, but a very beautiful spectacle—the man who is to receive saying "Don't give me so much," and the man who is to give saying "Take it all." (Laughter.)

Mr. Charles Watt Duthie and Mr. Charles Duthie, jun., denied that the plaintiff had been dismissed, and said they had not seen him at the works since October, 1927.

Commenting on the agreement, the Judge said the plaintiff was entitled by the agreement to £4 4s. a week, whether there was work for him to do or not, unless he agreed to the contract being modified or determined.

The jury awarded the plaintiff £300 damages, and judgment was given for this amount.

China Clay Exports—February, 1929

A RETURN showing the quantities and values of the exports of China Clay, including Cornish or China Stone, the produce of Great Britain and Northern Ireland, from Great Britain and Northern Ireland, as registered in the month of February, 1929, is as follows:—

COUNTRY OF DESTINATION.	QUANTITY. Tons.	VALUE. £
Sweden	1,577	2,990
Norway	401	501
Denmark (including Faröe Islands)	210	639
Germany	1,309	3,069
Netherlands	2,136	4,849
Belgium	4,482	8,285
France	2,492	4,076
Spain	984	1,910
Italy	686	1,715
Greece	23	80
China	28	145
Japan	50	225
United States of America	22,046	50,894
Peru	5	24
Uruguay	50	195
Argentine Republic	300	1,170
Irish Free State	12	56
Union of South Africa	—	1
British India, via Other Ports	544	2,560
Via Madras	10	44
Via Bengal, Assam, Bihar and Orissa	—	1
Hong Kong	—	1
Australia	12	137
	37,357	83,567

C

From Week to Week

MR. F. A. MACQUISTEN, it is learned, has resigned from the board of the Parent Coal Carbonisation Trust.

DR. G. C. CLAYTON, who, as reported in our last issue, was slightly injured a few days ago, is now much better.

SIR HARRY MCGOWAN was among the passengers on board the *Berengaria*, due to arrive at Southampton from New York yesterday, March 15.

PRODUCTION of fine-grade artificial silk by the Atlas Artificial Silk Processes will, state the directors, definitely begin by the end of next month.

IODINE to the value of 600,000 yen was exported from Japan to Russia in the year ended October 31, 1928. This represented about 70 per cent of the total export of iodine.

IMPERIAL CHEMICAL INDUSTRIES, it is stated, have now nearly completed negotiations with the Tees Conservancy Commissioners for the acquisition of 200 acres of land for the erection of additional chemical works.

PROFESSOR W. L. EVANS, of the department of chemistry of the Ohio State University, has been awarded the 1929 Nichols Medal of the American Chemical Society for his work on the chemistry of carbohydrates.

PROFESSOR IRVING MASSON, on Tuesday, lectured on "Chemistry in the Seventeenth and Eighteenth Centuries," in continuation of the "History of Science" series of public lectures at Armstrong College, Newcastle.

THE BILL providing for the transfer to the South Suburban Gas Co. of the Northfleet and Greenhithe Gas Co., Ltd., was passed by the Unopposed Bill Committee of the House of Commons on Wednesday, March 6. The purchase price has been agreed at £44,865.

OLIVER UNITED FILTERS, LTD., of Premier House, 150, Southampton Row, London, was registered on February 8 as a British company, for the manufacture of industrial filters and other machinery and equipment. The company will manufacture all its well-known products at the Bradford works.

THE COMMITTEE which has been appointed by the Department of Scientific and Industrial Research to undertake research on the River Tees into the general question of river pollution includes Dr. H. T. Calvert (Director of Water Pollution Research) and Dr. R. E. Slade. The investigation will be continued for one year in the first instance.

THE GAS LIGHT AND COKE CO. have placed an order for a Ruths steam storage plant, for their works at Brentford. This will be the second of this company's works to be equipped with a steam accumulator, as at Bromley-by-Bow a plant has been in operation since 1927. The British Sugar Manufacturers also recently placed an order for an accumulator plant to be installed at their beet sugar factory at Wissington, Norfolk.

THE UNIVERSITY COLLEGE COMMITTEE will award in June, 1929, a Bayliss-Starling Memorial Scholarship (about £120) for physiology and bio-chemistry. On or before May 15 next, each candidate must submit to the secretary of University College, London (Gower Street, W.C.1), a statement giving full particulars of his educational career and of his qualifications for entering on a course of training in the principles and methods of research.

THE BUSSEY COAL DISTILLATION CO. announce that progress in the erection of their plant at Glenboig, Glasgow, has exceeded expectations, and that the works will be in full operation in early May, instead of June, as formerly stated. The plant, which will treat 600 tons of coal a day, will be the largest in the world manufacturing smokeless fuel, oil, and gas under a low temperature process. The entire work is being carried out by Scottish labour.

A CASE (one of two) in which the Treasury were called upon to repay over £100,000 in respect of loans to companies under the Trade Facilities Acts, given in the report of the Comptroller and Auditor-General on the Consolidated Fund Account for the year ended March 31, 1928, is that in which the principal and interest of loans amounting to £180,000 were made to a Scottish company formed to manufacture sugar from home-grown beet. The company went into voluntary liquidation, and the Treasury was called upon to pay £174,446. It is added that the liquidation is not yet complete, and some part of the payments may be recovered.

DR. E. W. SMITH, formerly chief chemist to the Birmingham Gas Department, and now technical director of the Woodall-Duckham Companies, has been appointed chief technical officer (unpaid) of the Area Gas Supply Committee of the Board of Trade, following the appeal by the President, Sir Philip Cunliffe-Lister, to the industries concerned, that they should loan expert personnel for the work of the Committee. The Area Gas Supply Committee is carrying out an investigation spread over the industrial areas between Liverpool and the Humber, and between Leeds and Birmingham, in order to see if gas undertakings in that area can take a supply of gas from the coke ovens which already exist there, or which may be erected in the future.

THE PLANT of a large distillery, now being dismantled, is advertised for sale on p. xxix.

MR. K. WALLIS has been appointed by the Secretary of State for the Colonies as assistant analyst for Trinidad.

RECENT WILLS INCLUDE: Captain G. G. Blane, of Nairn and Windsor, a director of the Nitrate Producers' Steamship Company, unsettled property (net personalty £24,457) £32,254.

MR. AND MRS. FRANCIS P. GARVAN have been jointly awarded the medal of the American Institute of Chemists, for outstanding service to the science and profession of chemistry in America.

LEEDS PUBLIC LIBRARIES (Commercial and Technical Department) have published a special bulletin, giving a very comprehensive list of books and data on low temperature carbonisation which may be consulted.

WHAT HAS BEEN KNOWN for many years as the Bath and West of England College of Chemistry is likely to be closed shortly, and re-opened as the Bristol College of Chemistry in the Merchant Venturers' Hall in that city.

DR. W. O. KERMACK has been awarded the Makdougall-Brisbane prize of the Royal Society of Edinburgh, for the period 1924-28, for his contributions to chemical knowledge published in the Society's *Proceedings* and elsewhere.

THE BESSEMER GOLD MEDAL of the Iron and Steel Institute has been awarded to Sir Charles A. Parsons, in recognition of his distinguished services in advancing the science of engineering as applied to the manufacture of iron and steel.

THE HOOKER ELECTRO CHEMICAL CO. has erected in Tacoma, in the west of the United States, a factory with a daily output of 30 tons of 76 per cent. caustic soda and 26 tons of chlorine, as well as hydrochloric acid and various chlorinated products.

NEGOTIATIONS with a view to Courtaulds establishing a new factory on land belonging to the Preston Corporation at Fishwick Bottoms have, it is stated, been broken off, but the firm has now secured the option of some fields in the neighbourhood of Horse Shoe Bend, about a mile further up the river Ribble.

THE DEATH of Erland Peter Wahlstrom, aged 35, a Swedish student of chemistry, who was found gassed in a boarding house at Torrington Square, Bloomsbury, was inquired into at the Holborn coroner's court on Wednesday by Sir Walter Schroder. The inquest was adjourned until March 22 to enable inquiries to be made in Sweden.

A LARGE FACTORY for the production of synthetic nitrogen compounds is to be erected at Sluiskil, in Holland, in connection with the local coke-ovens, which will provide the necessary hydrogen. The annual production will be equivalent to 40,000-45,000 tons of nitrogen. The Montecatini company, whose processes will be used, is an interested party.

THE BOARD of the English Steel Corporation has now been constituted as follows: Mr. G. R. T. Taylor (deputy chairman), General Sir J. F. Noel Birch, Commander C. W. Craven, R.N., Mr. W. L. Hichens, Mr. T. L. Taylor, Mr. R. Whitehead, J.P. The English Steel Corporation has been formed to take over various steel interests from Vickers-Armstrongs, Vickers, and Cammell Laird and Co. Negotiations have been in progress for including other important firms.

LEEDS CORPORATION have been notified that the Ministry of Health has decided to allow the appeal of the Viceroy of India (Lord Irwin) and the Waterloo Main Colliery Co., Ltd., against the refusal of the Corporation to grant permission for the erection of coke ovens and a by-product plant at Thorpe Stapleton. The appeal is allowed subject to satisfactory means being provided to prevent the emission of the gas and smoke evolved from the coke ovens during the period that the ovens are being charged.

MR. A. J. PACK, the Commercial Secretary in the United States of America, will shortly visit this country on official business. Mr. Pack will be at the offices of the Department of Overseas Trade for a few days commencing on March 18, for the purpose of interviewing representatives of United Kingdom firms interested in the export of British goods to the United States of America. He will subsequently visit a few of the principal commercial centres in the United Kingdom. Application for interviews in London should be addressed to The Comptroller-General, Department of Overseas Trade, 35, Old Queen Street, London, S.W.1, quoting the reference 12796/1.

Obituary

DR. RICHARD LÖWENHERZ, keeper of the Berlin Chemical Museum, on February 23, aged 61.

DR. WILHELM ROEHL, director of the chemotherapeutical laboratory of the I.G., joint discoverer of Plasmochin and Germanin, on March 9, aged 48.

MR. O. M. EDWARDS, of Wallasey, on March 4, in his sixty-sixth year, one of the best known figures in the Liverpool chemical industry, with which he had been connected for 48 years. Mr. Edwards, who was apprenticed to the late Professor E. K. Muspratt, was for many years a leading official of the United Alkali Co., Ltd., and latterly manager of the Liverpool area for Imperial Chemical Industries, Ltd. The funeral was attended by Sir Max Muspratt and representatives of the chemical trade from all over the country.

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British

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CATALYTIC REDUCTION.—Equilibrium in the system methyl alcohol-hydrogen-carbonic oxide. D. M. Newitt, B. J. Byrne, and H. W. Strong. *Proc. Roy. Soc. A.*, March 6, pp. 236–252. Gives the results of the interaction of hydrogen and carbon dioxide in the presence of a basic zinc chromate catalyst at temperatures of 280—340° C. and 100 atmospheres pressure.

DISTILLATION.—Some experiments on vacuum distillation. C. R. Burch. *Proc. Roy. Soc. A.*, March 6, pp. 271–284. Crude petroleum and various petroleum derivatives have been distilled under conditions practically equivalent to evaporation into a perfect vacuum. Derivatives of very high molecular weight can be fractionated without detectable decomposition. Decomposition ("cracking") sets in quite suddenly, at temperatures varying from 307° to 340° C. for the oils tried.

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VULCANISATION.—The nature of vulcanisation. IV.—H. P. Stevens and W. H. Stevens. *J.S.C.I.*, March 8, pp. 55–59T.

Note on the nature of vulcanisation. W. H. Stevens. *J.S.C.I.*, March 8, pp. 60–62T.

United States

GENERAL.—Preparation of banana vinegar. H. von Loesecke. *Ind. and Eng. Chem.*, February 1, pp. 175–176. A record of laboratory-scale work on the production of vinegar by the fermentation of banana mash (pulp and peel of ripe fruit) with *Saccharomyces ellipsoideus*.

ORGANIC.—A new series of sulphone-phthaleins. W. C. Harden with N. L. Drake. *J. Amer. Chem. Soc.*, February, pp. 562–566.

The formation of primary amines from Grignard reagents and monochloroamine. II.—G. H. Coleman and C. B. Yager. *J. Amer. Chem. Soc.*, February, pp. 567–569.

PAINT.—Titanium offers unusual possibilities as a pigment. A. W. Hixon and W. W. Plechner. *Chem. and Met. Eng.*, February, pp. 76–78.

PATENTS.—What constitutes invention? L. Burgess. *Chem. and Met. Eng.*, February, pp. 83–84.

Providing for patent obsolescence in the chemical industry. F. P. Byerly. *Chem. and Met. Eng.*, February, pp. 92–94.

SULPHURIC ACID.—Liquid phase operation of sulphuric acid chambers gains significance in Europe. P. Parrish. *Chem. and Met. Eng.*, February, pp. 68–72.

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CELLULOSE.—The effect of air in the preparation and working-up of pure cellulose for high-grade viscose rayon. W. A. Dyes. *Chemiker-Zeitung*, March 6, pp. 185–186.

Contribution to our knowledge of the hydrolysis of cellulose. II.—R. Willstätter and L. Zechmeister. *Berichte*, March 6, pp. 722–725.

COLLOIDS.—The characterisation of colloidal solutions by the state of polarisation of the Tyndall light. R. O. Herzog and B. Lange. *Berichte*, March 6, pp. 491–495.

CRACKING.—The chemistry of the cracking process. A. N. Ssachanen and M. D. Tilitschejew. *Berichte*, March 6, pp. 658–677. Naphtha, solid paraffin, di-isoamyl, naphthalene, anthracene, cymol, tetralin, and naphthenes have been submitted to a cracking process and the products investigated.

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GENERAL.—Economic-chemical considerations on the working-up of raw materials. A. Sulfrian. *Chem. Fabrik*, March 6, pp. 109–111.

The extraction of orujo (the press residues from the olive oil industry) with carbon disulphide. I. and II.—J. Bohle. *Chemiker-Zeitung*, February 27, pp. 165–167, March 6, pp. 187–189.

The investigation of alcohol fuel. I. and II.—K. R. Dietrich and H. Jeglinski. *Chemiker-Zeitung*, March 2, pp. 177–178; March 9, pp. 198–199.

ORGANIC.—5 : 8-Dihydroxy-α-anthrapyridinequinone. H. Raudnitz. *Berichte*, March 6, pp. 509–513.

The pyrogenetic decomposition of aromatic compounds under hydrogen pressure in the presence of a mixed catalyst. II.—W. Ipatiew and N. Orlow. *Berichte*, March 6, pp. 593–597.

The hydrogenation of phenanthrene. II.—G. Schroeter H. Müller, and J. Y. S. Huang. *Berichte*, March 6, pp. 645–658.

The pyrogenetic decomposition of some condensed ring systems. N. A. Orlow. *Berichte*, March 6, pp. 710–719.

The pyrogenetic decomposition of chrysene under hydrogen pressure. N. A. Orlow and N. D. Lichatshew. *Berichte*, March 6, pp. 719–721. Chrysene, heated with anhydrous ferric chloride (catalyst) and hydrogen under pressure (85 atmospheres) at 440–450° C., yielded phenanthrene and its tetrahydride, naphthalene and its homologues and hydrides, and benzenoid hydrocarbons.

Miscellaneous

ANALYSIS.—The determination and separation of rare metals from other metals. XIII.—The examination of the gravimetric analysis of vanadium and two new methods for its determination. L. Moser and O. Brandl. *Monatshefte fur Chem.*, Vol. 51, Parts 2–3, pp. 169–180.—XIV.—The separation of beryllium from the alkaline earth metals, the metals of the ammonium sulphide group and the arsenic group. L. Moser and F. List. *Ibid.*, pp. 181–189 (in German).

Methods of analysis of photographic emulsion. S. Matsumaye. *J. Soc. Chem. Ind. Japan* (supplemental binding), February, p. 34B (in English).

Determination of polysulphide sulphur and nitrogenous substances in commercial sodium sulphide. K. Shimo and Y. Wakita. *J. Soc. Chem. Ind. Japan* (supplemental binding), February, pp. 38–40B (in English).

COLLOIDS.—Contradictions in the physical chemistry of the colloids. A. Lumière. *Chimie et Industrie*, February, pp. 223–226 (in French).

GENERAL.—Fermentation of soybean meal. K. Shimo and T. Harada. *J. Soc. Chem. Ind. Japan* (supplemental binding), February, pp. 40–42B (in English).

The extraction and concentration of acetic acid from its dilute aqueous solutions. H. Guinot. *Chimie et Industrie*, February, pp. 243–251 (in French).

An improvement in the method of recovery of benzene from coke oven gas. M. Minot. *Chimie et Industrie*, February, p. 252 (in French).

OILS.—Researches on sulphonated oils. III.—On the hydrolysis of ricinoleic acid sulphuric ester and its sodium salt. IV.—On the preparation of sodium sulphoricinoleate and its isolation from commercial products. K. Winokuti and K. Nishizawa. *J. Soc. Chem. Ind. Japan* (supplemental binding), February, pp. 47–48B, 48–49B (in English).

Researches on insect oils. I.—Firefly, locust, and cricket oils. M. Tsujimoto. *J. Soc. Chem. Ind. Japan* (supplemental binding), February, pp. 49–54B (in English).

Patent Literature

The following information is prepared from published Patent Specifications and from the Illustrated Official Journal (Patents) by permission of the Controller to H.M. Stationery Office. Printed copies of full Patent Specifications accepted may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2, at 1s. each.

Abstracts of Complete Specifications

305,494. Tar Acids from Ammonia Liquor and Other Liquors, Removal of. H. W. Robinson, Exchange Buildings, Stephenson Place, Birmingham, and D. W. Parkes, Ryders Green, West Bromwich, Stafford. Application dates, August 5, 1927, December 23, 1927, February 17, 1928, and June 5, 1928.

Ammonia liquor is subjected to preliminary distillation for recovery of ammonia and to remove organic matter, sulphides, and carbonates. Alternatively, a mineral acid may be added to the liquor to remove organic impurities as sludge. The purified liquor is then treated with ammonia to render it alkaline, and then with a reagent which reacts with the ortho-dioxy-benzene or pyrocatechol bodies to precipitate them as insoluble compounds, and the liquor is then treated with activated carbon to remove the tar acids. The last step may be carried out as described in Specification No. 260,686 (see The Chemical Age, Vol. XV, p. 571). If the liquor contains large quantities of inorganic impurities, the preliminary treatment is preferably with bleaching powder which reacts with the sulphides, and lime which reacts with the soluble carbonates. The reagent for precipitating the catechols is preferably lead chloride, acetate, nitrate, hydroxide, carbonate, or monoxide. The precipitated lead catechol may be treated with hydrochloric acid so that catechol is liberated and lead chloride precipitated.

305,603. Hydrocarbon Derivatives and Hydrocarbons which are not Saturated with Hydrogen, Process for the Manufacture of. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, October 6, 1927.

These products are obtained from the hydrocarbon gases and vapours containing saturated hydrocarbons of low molecular weight up to pentane, which are obtained in the destructive distillation of coal, etc. These gases are subjected to a temperature of 500°—850° C. in the presence of catalysts acting as oxygen-transferers in association with gases containing oxygen or sulphur. The catalyst may be manganese peroxide or sulphide, vanadium oxide, oxide of molybdenum, chromium, or aluminium, active carbon or silica, carbonates of the alkaline earth metals. The gas may consist of carbon dioxide, steam, or air. The products consist of acetic acid, and its homologues, ketones, aldehydes, alcohols, and olefines such as butadiene, butylene, propylene, etc. The olefines may be polymerised to substances of high molecular weight, such as lubricating oils, or polymerisation products which are plastic or elastic. Some examples are given of the treatment of the waste gases obtained in the destructive hydrogenation of coal, tars, etc.

305,753. Catalytic or Contact Materials and Processes. A. Hurter, 27, Soho Square, London, W.1. Application date, December 7, 1927.

A catalyst for the synthesis of ammonia at low temperature and pressure is prepared from double compounds of iron with cyanogen and alkalies, alkaline earths, or other earths, together with zirconium oxide or other zirconium compounds. The mixture is evaporated to dryness and heated in a stream of hydrogen, with or without nitrogen, at a temperature up to 140° C. at atmospheric pressure, then increasing the temperature to 400° C. and then increasing the pressure to 90 atmospheres. A suitable mixture consists of potassium ferrocyanide 10 parts, in water 40 parts, added to zirconium oxychloride 5 parts, in water 30 parts.

305,754. Acenaphthene Derivatives, Manufacture of. G. T. Morgan and H. A. Harrison, Chemical Research Laboratory, Teddington, Middlesex. Application date, December 8, 1927.

It is found that when acenaphthene is nitrated under anhydrous conditions and the reaction product then treated by physical processes, 2-nitro acenaphthene melting at 151° C. is obtained. The substance develops a greyish-blue coloration with cold concentrated sulphuric acid and resists oxidation in circumstances in which 4-nitro-acenaphthene would be converted into 4-nitro-naphthalic acid. The 2-nitro-acenaphthene may be reduced to 2-amino-acenaphthene, which differs in properties from 1-, 3-, and 4-amino-acenaphthene. These derivatives are suitable for the production of intermediates for making dyes and therapeutic compounds. Examples are given.

305,760. Fertilizers, Manufacture of. R. E. Slade, Norton Hall, The Green, Norton-on-Tees, Durham, and Imperial Chemical Industries, Ltd., Broadway Buildings, London, S.W.1. Application date, December 13, 1927.

Use is made of calcium carbonate which is a by-product of the preparation of ammonium sulphate from ammonium carbonate and calcium sulphate, and which contains a small proportion of ammonium sulphate. The fertiliser is made by mixing 57 parts of this calcium carbonate with 43 parts of ammonium nitrate in 90 per cent. solution. The mixture is heated to 50°—100° C. in a vacuum evaporator with stirring. The dry product is sieved, and the portion which is too large or too small is returned to the process.

305,763. Oxy-diarylketones, Manufacture of. O. Y. Imray, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, December 16, 1927.

Oxy-diarylketones are obtained by condensing an ortho-oxy-aryl carboxylic acid halide with an aromatic hydrocarbon which may contain a non-reactive substituent in the molecule in the presence of aluminium chloride. Examples are given of the condensation of 2 : 3-oxynaphthoyl-chloride with benzene to obtain 2 : 3-oxynaphtho-phenone; 2 : 3-oxynaphthoyl-chloride with toluene to obtain 2 : 3-oxynaphthyl-4′-tolyl-ketone; and others. These products are intermediates for the production of dyestuffs.

305,599. Alumina, Sodium Carbonate and Hydrochloric Acid, Process for the Production of. N. J. Gareau, Jackson Building, 122, Bank Street, Ottawa, Canada. Application date, August 3, 1927.

Clay which is low in magnesia, lime and iron, is briquetted and then calcined at a red heat, and the briquettes are treated in a tower with a spray of cold water at the top, while steam, air, sulphur trioxide, sulphur dioxide, and nitric oxide, with furnace gases, are passed upwards through the tower. At the top the water absorbs the oxides of sulphur and nitrogen not taken up below, and the acid solution is absorbed by the clay. The sulphuric acid acts on the clay, nitric oxide is released, and steam rises and is condensed above. The sulphuric acid decomposes the clay and dehydrates the silica, and the heat is so regulated that the aluminium sulphate is not decomposed. The briquettes are then leached with hot dilute sulphuric acid to obtain a concentrated solution of aluminium sulphate, which is run on to a furnace hearth where sulphur trioxide is liberated. The sulphur trioxide, steam, and furnace gases are used again. The residue of $Al_2O_3SO_3$ is then ground with sodium chloride and small coal, briquetted, and treated at 300° C. with steam, which liberates hydrochloric acid gas. The briquettes consisting of Al_2O_3, Fe_2O_3, and Na_2SO_4 are then heated to redness in a furnace where the sodium sulphate is reduced to sulphide, iron oxide to iron, and calcium sulphate to calcium sulphide. The briquettes are then heated to a high temperature with superheated steam, whereby sodium aluminate is formed and hydrogen sulphide evolved, which burns to sulphur dioxide and is then converted into trioxide by the nitric acid in the tower. The sodium aluminate is leached out and purified, and is then treated with carbon dioxide to obtain alumina and sodium carbonate.

305,816. Hydrocyanic Acid, Catalyst for the Production of. T. Ewen, Norton Hall, The Green, Norton-on-Tees, Durham, and Imperial Chemical Industries, Ltd., Broadway Buildings, London, S.W.1. Application date, February 10, 1928.

Formamide vapour is passed over a dehydrating catalyst

such as vitreous alumina obtained by heating precipitated alumina to redness. It decomposes according to the equation

$$H.CO.NH_2 = HCN + H_2O$$

This catalyst is too active and the formamide is partly decomposed into ammonia and carbon monoxide. A less active catalyst is obtained by igniting alumina for several hours to 1,400°—1,500° C. The starting material may be commercial fused alumina, or preferably pure alumina. Other dehydrating catalysts such as zirconia and thoria can be used.

305,860. Hydrogen Cyanide from Cyanides of Alkali Metals, Production of. J. Y. Johnson, London. From I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. Application date, March 23, 1928.

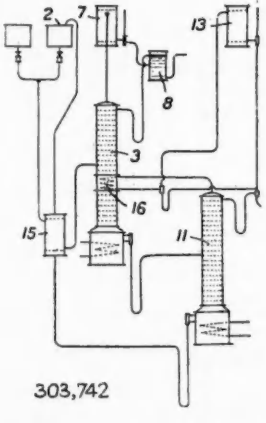
Pure hydrogen cyanide is obtained by treating alkali metal cyanide, or material containing it, with an aqueous suspension of sodium bicarbonate. The temperature is raised to 50° C. and the hydrogen cyanide expelled by lowering the pressure. It is found that no polymerisation or decomposition of the hydrogen cyanide takes place. The sodium carbonate obtained as a by-product may be used for the production of cyanides from nitrogen, coal, and sodium carbonate.

Note.—Abstracts of the following specifications which are now accepted, appeared in The Chemical Age when they became open to objection under the International Convention: —279,815 (Naugatuck Chemical Co.) relating to vulcanisation of rubber, see Vol. XVII, p. 623; 281,690 (I.G. Farbenindustrie Akt.-Ges.) relating to arseno-benziminazolones, see Vol. XVIII, p. 127; 287,133 (Kali-Industrie Akt.-Ges., C. T. Thorsell, and A. Kristensson) relating to recovery of nitrogen, see Vol. XVIII, p. 495; 287,858 (I.G. Farbenindustrie Akt.-Ges.) relating to substituted thioglycollic acids, see Vol. XVIII, p. 516; 292,995 (Soc. Anon. des Fours à Coke Semet-Solvay et Piette) relating to ammonium sulphate, see Vol. XIX, p. 195; 290,189 (I.G. Farbenindustrie Akt.-Ges.) relating to acid-proof vessels, see Vol. XIX, p. 35; 293,353 (Soc. Anon. Compagnie de Produits Chimiques et Electro-Metallurgiques Alais, Forges, et Camargue) relating to electrolytic refining of aluminium, see Vol. XIX, p. 31 (Metallurgical Section); 293,392 (J. C. Seailles) relating to manufacture of alumina, see Vol. XIX, p. 219; 294,889 (I.G. Farbenindustrie Akt.-Ges.) relating to aromatic oxy-aldehydes, see Vol. XIX, p. 323; 298,537 (Naugatuck Chemical Co.) relating to vulcanization accelerators, see Vol. XIX, p. 656; 299,020–1 (I.G. Farbenindustrie Akt.-Ges.) relating to destructive hydrogenation of carbonaceous materials, see Vol. XIX, p. 591.

International Specifications not yet Accepted

303,742. Dehydrating Aqueous Formic Acid. Distilleries des Deux-Sèvres, Melle, Deux-Sèvres, France. International Convention date, January 7, 1928.

Aqueous formic acid solutions are distilled with an entraining substance forming with water an azeotropic mixture of minimum boiling point and a diluent liquid which prevents the



303,742

formic acid from distilling over. Formic acid of 77 per cent. strength is distilled with isobutyl formate as water entrainer, and normal amyl formate as diluent in a column 3. A mixture of water and isobutyl formate boiling at 80·4° C. collects in a vessel 7 and is separated in a vessel 8 into two layers. The non-aqueous layer is returned to the top of the column. The residue of formic acid and normal amyl formate is separated in a column 11, and waste heat is utilised in a coil 16 in the column 3. Anhydrous formic acid is condensed at 13, and amyl formate passes back through heat interchanger 15 to its reservoir 2. Alternatively a single liquid serving both purposes may be used, *e.g.*, butyl, amyl, or isoamyl formate, or dibutyl ether.

303,797. Cuprene. Naamlooze Vennootschap Electro-Zuurstof-en Waterstoffabriek, 90, Distelweg, Amsterdam. International Convention date, January 9, 1928.

Cuprene for use as a substitute for decolorising charcoal is obtained by treating acetylene with a metal or metal oxide catalyst such as copper, nickel, or iron, or their oxides, with a small proportion of magnesium, at 200° to 240° C. The product can be used to decolorise blue methylated spirit.

303,808. Ferric Oxide and Sulphuric Acid. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, January 9, 1928.

Iron sulphates are dehydrated and decomposed in the presence of ferric oxide and a small amount of an alkali or alkaline earth oxide, hydroxide or carbonate. The operation may be conducted first at 300° to 400° C., and then at 750° to 800° C. in a calcining furnace. Sulphur trioxide is recovered.

303,827. Indiarubber. Goodyear Tire and Rubber Co., 1144, East Market Street, Akron, Ohio, U.S.A. (Assignees of J. Teppema, 29, Mayfield Apartment, Twin Oaks, Akron, Ohio, U.S.A.) International Convention date, January 10, 1928.

Compounds which accelerate vulcanisation and improve the ageing qualities of indiarubber consists of reaction products of mercaptothiazoles and nitroso compounds.

303,838. Dyes. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, January 10, 1928.

These dyes are obtained by coupling an arylide of 2:3-oxynaphthoic acid with a diazotised 1:4-phenylene-diamine or a homologue or substitution product, substituted in one amino group by an acidyl group from an aromatic carboxylic acid, *e.g.*, benzoic acid, its homologues and susbtitution products, naphthoic acid, or terephthalic acid. Blue to violet shades are obtained, and examples are given.

303,857. Alkali Bicarbonates. Pennsylvania Salt Manufacturing Co., Widener Building, Philadelphia, U.S.A. (Assignees of A. E. Gibbs, Wayne, Pa., U.S.A.) International Convention date, January 11, 1928.

The cathode liquor from an alkali chloride electrolytic cell is treated with carbon dioxide or flue gas to obtain alkali bicarbonates.

303,901. Dye Intermediates. I.G. Farbenindustrie Akt.-Ges., Frankfort-on-Main, Germany. International Convention date, January 12, 1928.

Intermediates for dyestuffs and pharmaceutical products are obtained by the action of carbon dioxide on an alkali compound of a hydroxycarbazole or on a hydroxycarbazole in the presence of alkali hydroxide or carbonate.

Latest Notifications.

306,935. Process for the continuous production of fused caustic alkalis. I.G. Farbenindustrie Akt.-Ges. February 29, 1928.

306,939. Process for the manufacture of N-methyl-aminophenols. Chemische Fabrik Grünau, Landshoff and Meyer Akt.-Ges. February 29, 1928.

306,905. Process for the manufacture of new therapeutical agents. I.G. Farbenindustrie Akt.-Ges. February 27, 1928.

306,906. Manufacture of insect glue. I.G. Farbenindustrie Akt.-Ges. February 27, 1928.

306,908. Process for the manufacture of evenly-dyed viscose fabrics. I.G. Farbenindustrie Akt.-Ges. February 27, 1928.

306,963. Process for the manufacture of anthraquinone derivatives. I.G. Farbenindustrie Akt.-Ges. February 29, 1928.

306,911. Cellulose acetate compositions. Du Pont de Nemours and Co., E. I. February 27, 1928.

306,971. Manufacture of viscose. I.G. Farbenindustrie Akt.-Ges. February 28, 1928.

306,972. Manufacture of condensation products of arylamines. Haller, P., and Kappeler, H. February 29, 1928.

307,079. Process for dissolving organic colloids. Oranienburger Chemische Fabrik Akt.-Ges. March 2, 1928.

307,303. Process for the manufacture of monoazo dyestuffs. I.G. Farbenindustrie Akt.-Ges. March 2, 1928.

307,304. Process for the manufacture of alcohols containing basic substitutents. I.G. Farbenindustrie Akt.-Ges. March 2, 1928.
307,305. Process for the manufacture of amino-alkyl compounds. I.G. Farbenindustrie Akt.-Ges. March 2, 1928.
307,306. Process for the manufacture of anthraquinone derivatives. I.G. Farbenindustrie Akt.-Ges. March 3, 1928.
307,307. Process for the manufacture of tertiary basic substituted alcohols. I.G. Farbenindustrie Akt.-Ges. March 2, 1928.
307,308. Process for the manufacture of rubber-like masses. I.G. Farbenindustrie Akt.-Ges. March 3, 1928.

Specifications Accepted with Date of Application

276,697. Objects of acid proof material, Manufacture of. I.G. Farbenindustrie Akt.-Ges. August 30, 1926.
279,857. Decomposition compounds from condensation products of *m*- and *p*-cresol with acetone, Manufacture of. Schering Kahlbaum Akt.-Ges. October 26, 1926.
281,288. Extracting ammonia from gases, more particularly coke oven gas. Ges. für Linde's Eismaschinen Akt.-Ges. November 27, 1926.
281,338. Metallic ores, Roasting and reduction of. F. L. Duffield. November 29, 1926.
306,425. Ores, oxides, and the like, Reduction of. H. E. Coley, September 14, 1927.
306,434. Pyranthrone dyestuffs. British Alizarine Co., Ltd., and P. Beghin. November 17, 1927.
306,437. Hydrocarbons of low boiling point, Manufacture of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) October 20. 1927.
306,561. Iron ores or oxides, Reduction of. J. W. Hornsey, August 18, 1927.
306,562. Acid-proof and other tanks, pipes, linings, walls, and the like. H. W. Fender, and Prodorite, Ltd. August 22, 1927.
306,563. Hydroxyalkylamines, Production of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) August 24, 1927.
306,566. Ores or the like containing platinum, Treatment of. S. C. Smith. October 21, 1927.
306,569. Zinc sulphide ores, Roasting of. S. Robson. October 24, 1927.
306,573. Dyes and dyeing. R. S. Barnes, J. E. G. Harris, J. Thomas, and Scottish Dyes, Ltd. November 17, 1927.
306,575 and 306,607. Ortho-cyanaryl-thioglycollic acids and intermediate products, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) November 18, 1927.
306,590. Ortho-aminoaryl-mercaptans, Manufacture of. A. Carpmael. (*I.G. Farbenindustrie Akt.-Ges.*) November 23, 1927.
306,670. Pig iron, Production of. Bradley and Foster, Ltd., and R. P. Bethell. January 16, 1928.
306,691. Pyrites, Treatment of. S. I. Levy and G. W. Gray. February 10, 1928.
306,705. Nitric acid, Manufacture of. W. R. Ormandy. February 21, 1928.
306,732. Complex metal compounds of *o*-hydroxyazo dyestuffs. Production of. J. Y. Johnson. (*I.G. Farbenindustrie Akt.-Ges.*) March 21, 1928.
306,787. Ores and the like, Apparatus for roasting or sintering. National Processes, Ltd., and G. E. Storer. July 21, 1928.

Applications for Patents

Bentley, W. H., J. Riley and Sons, Ltd., Coates, W. M., Wilde, W. Purification of sulphuric acid. 7,404. March 7.
Brightman, R., and Imperial Chemical Industries, Ltd. Manufacture of azo dyes, etc. 7,209. March 5.
Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of hydrogenated compounds of naphthalene series. 7,033. March 4.
Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of soluble wood ethers. 7,224. March 5.
Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Steam production, etc. 7,225. March 5.
Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of salts of higher homologues of polyhydroxybenzenes. 7,365. March 6.
Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of hydroxy carboxylic acids of fluorene. 7,366. March 6.
Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of sulphur dyestuffs. 7,390. March 6.
Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Vat-dyeing, etc. 7,528. March 7.
Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of reserve dyeings on wool, etc. 7,655. March 8.
Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of acetic anhydride. 7,656. March 8.
Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Printing-pastes. 7,657. March 8.
Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of polymethine dyestuffs. 7,658. March 8.
Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Manufacture of hydrogenated hydroxy derivatives of the diphenyl series. 7,659. March 8. (January 28, 1928.)
Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Phenolic condensation products. 7,782. March 9.
Carpmael, A., and I.G. Farbenindustrie Akt.-Ges. Treatment of wool. 7,783. March 9.
Cellulose Acetate Silk Co., Ltd., and Hayes, D. Concentration of acetic acid, etc. 7,637. March 8.
Coley, H. E. Reduction of ores, oxides, etc. 7,151, 7,152. March 5.
Coley, H. E. Extraction of oil from shale. 7,461. March 7.
Coley, H. E. Manufacture of zinc. 7,616. March 8.
Coley, H. E. Manufacture of tin. 7,617. March 8.
Consortium für Elektrochemische Industrie Ges. Process for obtaining concentrated acetic acid. 7,485. March 7. (Germany, March 19, 1928.)
Craig, T. J. I., P. Spence and Sons, Ltd., and Ormandy, W. R. Preparation of materials for absorbing ammonia. 7,741. March 9.
Du Pont de Nemours and Co., E. I., and Marks, Sir G. C. Rosin soap lakes of azo compounds. 7,639. March 8.
Du Pont de Nemours and Co., E. I. Alkylating cellulose. 7,599. March 8. (United States, May 14, 1928.)
Fairweather, D. A. W. Dyes, etc. 7,539. March 7.
Haendel, W. Dyeing fabrics, etc. 7,596. March 8. (Germany, April 7, 1928.)
Harrison, A. A., Imperial Chemical Industries, Ltd., Jackson, H., and Linch, F. W. Preparation of colour lakes of basic dyestuffs. 7,381. March 6.
Hercules Powder Co. Nitric acid. 7,781. March 9. (United States, January 28.)
Hoffmann-La Roche and Co. Akt.-Ges., F. Manufacture of β-aryl-α-amino propionic acids, etc. 6,934. March 4. (Germany, September 6, 1928.)
I.G. Farbenindustrie Akt.-Ges. Preventing deposition of carbon, etc., upon heated ceramic materials. 7,471. March 7.
I.G. Farbenindustrie Akt.-Ges., and Johnson, J. Y. Production of 1.3-butylene glycol. 7,754. March 9.
I.G. Farbenindustrie Akt.-Ges., and Johnson, J. Y. Production of new compounds. 7,755. March 9.
I.G. Farbenindustrie Akt.-Ges. Manufacture of monoazo dyestuffs. 7,027. March 4. (Germany, March 2, 1928.)
I.G. Farbenindustrie Akt.-Ges. Manufacture of alcohols containing basic substituents. 7,028. March 4. (Germany, March 2, 1928.)
I.G. Farbenindustrie Akt.-Ges. Manufacture of aminoalkyl compounds. 7,029. March 4. (Germany, March 2, 1928.)
I.G. Farbenindustrie Akt.-Ges. Manufacture of anthraquinone derivatives. 7,030. March 4. (Germany, March 3, 1928.)
I.G. Farbenindustrie Akt.-Ges. Manufacture of tertiary basic substituted alcohols. 7,031. March 4. (Germany, March 2, 1928.)
I.G. Farbenindustrie Akt.-Ges. Manufacture of rubber-like masses. 7,032. March 4. (Germany, March 3, 1928.)
I.G. Farbenindustrie Akt.-Ges. Manufacture of resinous products. 7,174. March 5. (Germany, December 24, 1928.)
I.G. Farbenindustrie Akt.-Ges. Manufacture of cellulose ether lacquers. 7,219. March 5. (Germany, March 5, 1928.)
I.G. Farbenindustrie Akt.-Ges. Photographic roll films. 7,486. March 7. (Germany, March 9, 1928.)
I.G. Farbenindustrie Akt.-Ges. Manufacture of lakes or pigments. 7,529. March 7. (Germany, March 7, 1928.)
I.G. Farbenindustrie Akt.-Ges. Treating etched plates of magnesium-alloys for chemigraphic purposes. 7,534. March 7. (Germany, July 25, 1928.)
I.G. Farbenindustrie Akt.-Ges. Manufacture of ethyl acetate. 7,633. March 8. (Germany, March 8, 1928.)
I.G. Farbenindustrie Akt.-Ges. Production of photo copies, etc. 7,765. March 9. (Germany, March 10, 1928.)
I.G. Farbenindustrie Akt.-Ges. Dyes. 7,784. March 9. (Germany, March 10, 1928.)
Imperial Chemical Industries, Ltd., and Kenner, J. Manufacture of m-2-xylidine. 7,210. March 5.
Imperial Chemical Industries, Ltd. Manufacture of leather-cloth, etc. 7,538. March 7.
James, G. E., James, R. W., and National Aniline and Chemical Co. Distillation of naphthalene. 7,016. March 4.
May and Baker, Ltd. Preparation of organo metallic compounds. 7,685. March 8.
Peski, A. J. van. Destructive hydrogenation of carbonaceous materials. 7,678. March 8. (January 18, 1928.)
Scottish Dyes, Ltd., Thomas, J., Willimott, S. G., and Smith, W. Production of dyestuffs, etc. 7,202. March 5.
Scottish Dyes, Ltd., and Thomas, J. Dyes, etc. 7,539. March 7.
Uhde, F. Production of material containing calcium nitrate. 7,194. March 5. (Germany, March 27, 1928.)

Weekly Prices of British Chemical Products

The prices and comments given below respecting British chemical products are based on direct information supplied by the British manufacturers concerned. Unless otherwise qualified, the figures quoted apply to fair quantities, net and naked at makers' works.

General Heavy Chemicals

ACID ACETIC, 40% TECH.—£19 per ton.

ACID BORIC, COMMERCIAL.—Crystal, £30 per ton; powder, £32 per ton; extra fine powder, £34 per ton.

ACID HYDROCHLORIC.—3s. 9d. to 6s. per carboy d/d, according to purity, strength and locality.

ACID NITRIC, 80° TW.—£21 10s. to £27 per ton, makers' works, according to district and quality.

ACID SULPHURIC.—Average National prices f.o.r. makers' works, with slight variations up and down owing to local considerations; 140° Tw., Crude Acid, 60s. per ton. 168° Tw., Arsenical, £5 10s. per ton. 168° Tw., Non-arsenical, £6 15s. per ton.

AMMONIA ALKALI.—£6 15s. per ton f.o.r. Special terms for contracts.

BISULPHITE OF LIME.—£7 10s. per ton, f.o.r. London, packages free.

BLEACHING POWDER.—Spot, £9 10s. per ton d/d; Contract, £8 10s per ton d/d, 4-ton lots.

BORAX, COMMERCIAL.—Crystals, £19 10s. to £20 per ton; granulated, £19 per ton; powder, £21 per ton. (Packed in 2 cwt. bags carriage paid any station in Great Britain.)

CALCIUM CHLORIDE (SOLID).—£5 to £5 5s. per ton d/d carr. paid.

COPPER SULPHATE.—£25 to £25 10s. per ton.

METHYLATED SPIRIT 61 O.P.—Industrial, 1s. 3d. to 1s. 8d. per gall. pyridinised industrial, 1s. 5d. to 1s. 10d. per gall.; mineralised 2s. 4d. to 2s. 8d. per gall.; 64 O.P., 1d. extra in all cases.

NICKEL SULPHATE.—£38 per ton d/d.

NICKEL AMMONIA SULPHATE.—£38 per ton d/d.

POTASH CAUSTIC.—£30 to £33 per ton.

POTASSIUM BICHROMATE.—4½d. per lb.

POTASSIUM CHLORATE.—3⅞d. per lb., ex-wharf, London, in cwt. kegs.

SALAMMONIAC.—£45 to £50 per ton d/d. Chloride of ammonia, £37 to £45 per ton, carr. paid.

SALT CAKE.—£3 15s. to £4 per ton d/d. In bulk.

SODA CAUSTIC, SOLID.—Spot lots delivered, £15 2s. 6d. to £18 per ton, according to strength; 20s. less for contracts.

SODA CRYSTALS.—£5 to £5 5s. per ton, ex railway depots or ports.

SODIUM ACETATE 97/98%.—£21 per ton.

SODIUM BICARBONATE.—£10 10s. per ton, carr. paid.

SODIUM BICHROMATE.—3½d. per lb.

SODIUM BISULPHITE POWDER, 60/62%.—£17 10s. per ton delivered for home market, 1-cwt. drums included; £15 10s. f.o.r. London.

SODIUM CHLORATE.—2¾d. per lb.

SODIUM NITRITE, 100% BASIS.—£27 per ton d/d.

SODIUM PHOSPHATE.—£14 per ton, f.o.b. London, casks free.

SODIUM SULPHATE (GLAUBER SALTS).—£3 12s. 6d. per ton.

SODIUM SULPHIDE CONC. SOLID, 60/65.—£13 5s. per ton d/d. Contract, £13. Carr. paid.

SODIUM SULPHIDE CRYSTALS.—Spot, £8 12s. 6d. per ton d/d. Contract, £8 10s. Carr. paid.

SODIUM SULPHITE, PEA CRYSTALS.—£14 per ton f.o.b. London, 1-cwt. kegs included.

Coal Tar Products

ACID CARBOLIC CRYSTALS.—6¼d. to 6¾d. per lb. Crude 60's, Mar., 1s. 10½d. per gall. April/June, 1s. 10d. per gall.

ACID CRESYLIC 99/100.—2s. 3d. to 2s. 10d. per gall. 97/99.—2s. 1d. to 2s. 2d. per gall. Pale, 95%, 1s. 10d. to 1s. 11d. per gall. Dark, 1s. 7½d. to 1s. 8½d.

ANTHRACENE.—A quality, 2d. to 2½d. per unit. 40%, £4 10s. per ton.

ANTHRACENE OIL, STRAINED.—5½d. to 6d. per gall. for 1080/1090. Unstrained, 6¾d. to 7d. per gall.

BENZOLE.—Prices at works: Crude, 10d. to 11d. per gall.; Standard Motor, 1s. 5d. to 1s. 6d. per gall.; 90%, 1s. 7d. to 1s. 8d. per gall; Pure, 1s. 10d. to 1s. 11d. per gall.

TOLUOLE.—90%, 1s. 7½d. to 2s. per gall. Firm. Pure, 2s. to 2s. 1d. per gall.

XYLOL.—1s. 5d. to 2s. per gall. Pure, 1s. 8d. to 1s. 9d. per gall.

CREOSOTE.—Cresylic, 20/24%, 7¼d. to 7½d. per gall.; Heavy, 6¼d. to 6½d. per gall. Middle oil, 5d. to 5½d. per gall. Standard specification, 3¾d. to 4¼d. per gall. ex works. Salty, 7½d. per gall.

NAPHTHA.—Crude, 8½d. to 9d. per gall. Solvent, 90/160, 1s. 3½d. to 1s. 4d. per gall. Solvent, 95/160, 1s. 4d. to 1s. 8d. per gall. Solvent 90/190, 1s. 1d. to 1s. 4d. per gall.

NAPHTHALENE, CRUDE.—Drained Creosote Salts, £4 10s. to £5 per ton. Whizzed, £5 per ton. Hot pressed, £8 10s. per ton.

NAPHTHALENE.—Crystals, £12 5s. to £14 10s. per ton. Quiet Flaked, £14 to £15 per ton, according to districts.

PITCH.—Medium soft, 32s. to 35s. per ton, f.o.b., according to district. Nominal.

PYRIDINE.—90/140, 4s. to 4s. 6d. per gall. 90/180, 2s. to 3s. per gal. Heavy, 1s. 6d. to 1s. 9d. per gall.

Intermediates and Dyes

In the following list of Intermediates delivered prices include packages except where otherwise stated:

ACID AMIDONAPHTHOL DISULPHO (1-8-2-4).—10s. 9d. per lb.

ACID ANTHRANILIC.—6s. per lb. 100%.

ACID BENZOIC.—1s. 8½d. per lb.

ACID GAMMA.—4s. 6d. per lb.

ACID H.—3s. per lb.

ACID NAPHTHIONIC.—1s. 6d. per lb.

ACID NEVILLE AND WINTHER.—4s. 9d. per lb.

ACID SULPHANILIC.—8½d. per lb.

ANILINE OIL.—8d. per lb. naked at works.

ANILINE SALTS.—8d. per lb. naked at works.

BENZALDEHYDE.—2s. 3d. per lb.

BENZIDINE BASE.—3s. 3d. per lb. 100% basis d/d.

BENZOIC ACID.—1s. 8½d. per lb.

o-CRESOL 29/31° C.—5½d. per lb.

m-CRESOL 98/100%.—2s. 3d. to 2s. 6d. per lb.

p-CRESOL 32/34° C.—2s. 3d. to 2s. 6d. per lb.

DICHLORANILINE.—1s. 10d. per lb.

DIMETHYLANILINE.—1s. 11d. per lb.

DINITHROBENZENE.—8d. per lb. naked at works. £75 per ton.

DINITROCHLORBENZENE.—£84 per ton d/d.

DINITROTOLUENE.—48/50° C. 7½d. per lb. naked at works. 66/68° C. 9d. per lb. naked at works.

DIPHENYLAMINE.—2s. 10d. per lb. d/d.

a-NAPHTHOL.—2s. per lb. d/d.

B-NAPHTHOL.—10d. per lb. d/d.

a-NAPHTHYLAMINE.—1s. 3d. per lb.

B-NAPHTHYLAMINE.—3s. per lb.

o-NITRANILINE.—5s. 9d. per lb.

m-NITRANILINE.—3s. per lb. d/d.

p-NITRANILINE.—1s. 8d. per lb.

NITROBENZENE.—6d. per lb. naked at works.

NITRONAPHTHALENE.—1s. 3d. per lb.

R. SALT.—2s. 2d. per lb.

SODIUM NAPHTHIONATE.—1s. 8½d. per lb. 100% basis d/d.

o-TOLUIDINE.—8d. per lb.

p-TOLUIDINE.—1s. 9d. per lb. naked at works.

m-XYLIDINE ACETATE.—2s. 6d. per lb. 100%.

N. W. ACID.—4s. 9d. per lb. 100%.

Wood Distillation Products

ACETATE OF LIME.—Brown, £9 15s. to £10 5s. per ton. Grey, £16 10s. to £17 10s. per ton. Liquor, 9d. per gall.

ACETONE.—£78 per ton.

CHARCOAL.—£6 to £8 10s. per ton, according to grade and locality.

IRON LIQUOR.—1s. 3d. per gall. 32° Tw. 1s. per gall. 24° Tw.

RED LIQUOR.—9d. to 10½d. per gall. 16° Tw.

WOOD CRESOTE.—1s. 9d. per gall. Unrefined.

WOOD NAPHTHA, MISCIBLE.—3s. 8d. to 3s. 11d. per gall. Solvent, 4s. to 4s. 3d. per gall.

WOOD TAR.—£3 10s. to £4 10s. per ton.

BROWN SUGAR OF LEAD.—£38 per ton.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 3d. per lb. according to quality; Crimson, 1s. 4d. to 1s. 6d. per lb., according to quality.

ARSENIC SULPHIDE, YELLOW.—1s. 9d. per lb.

BARYTES.—£5 10s. to £7 per ton, according to quality.

CADMIUM SULPHIDE.—5s. to 6s. per lb.

CARBON BISULPHIDE.—£25 to £27 10s. per ton, according to quantity

CARBON BLACK.—5½d. per lb., ex wharf.

CARBON TETRACHLORIDE.—£45 to £54 per ton, according to quantity, drums extra.

CHROMIUM OXIDE, GREEN.—1s. 2d. per lb.

DIPHENYLGUANIDINE.—3s. 9d. per lb.

INDIARUBBER SUBSTITUTES, WHITE AND DARK.—4⅝d. to 5¾d. per lb.

LAMP BLACK.—£32 10s. per ton, barrels free.

LEAD HYPOSULPHITE.—9d. per lb.

LITHOPONE, 30%.—£23 per ton.

MINERAL RUBBER "RUBPRON."—£13 12s. 6d. per ton, f.o.r. London.

SULPHUR.—£10 to £12 per ton, according to quality.

SULPHUR CHLORIDE.—4d. to 7d. per lb., carboys extra

SULPHUR PRECIP. B. P.—£55 to £60 per ton.

THIOCARBAMIDE.—2s. 6d. to 2s. 9d. per lb., carriage paid.

THIOCARBANILIDE.—2s. 1d. to 2s. 3d. per lb.

VERMILION, PALE OR DEEP.—6s. 10d. to 7s. per lb.

ZINC SULPHIDE.—8d. to 11d. per lb.

Pharmaceutical and Photographic Chemicals

ACID, ACETIC, PURE, 80%.—£39 per ton ex wharf London in glass containers.

ACID, ACETYL SALICYLIC.—2s. 4d. to 2s. 5d. per lb.

ACID, BENZOIC, B.P.2s. to 3s. 3d. per lb., according to quantity. Solely ex Gum, 1s. 3d. to 1s. 6d. per oz., according to quantity

ACID, BORIC B.P.—Crystal, 36s. to 39s. per cwt.; powder, 40s. to 43s. per cwt.; extra fine powder, 42s. per cwt., according to quantity. Carraige paid any station in Great Britain, in ton lots.
ACID, CAMPHORIC.—19s. to 21s. per lb.
ACID, CITRIC.—2s. 1d. to 2s. 2d. per lb., less 5%.
ACID, GALLIC.—2s. 8d. per lb. for pure crystal, in cwt. lots.
ACID, PYROGALLIC, CRYSTALS.—7s. 3d. per lb. Resublimed, 8s. 3d.
ACID, SALICYLIC, B.P. PULV.—1s. 4d. to 1s. 6d. per lb. Technical.—10½d. to 11½d. per lb.
ACID, TANNIC B.P.—2s. 8d. to 2s. 10d. per lb.
ACID, TARTARIC.—1s. 4½d. per lb., less 5%.
ACETANILIDE.—1s. 5d. to 1s. 8d. per lb. for quantities.
AMIDOL.—7s. 6d. to 9s. per lb., d/d.
AMIDOPYRIN.—7s. 9d. to 8s. per lb.
AMMONIUM BENZOATE.—3s. 3d. to 3s. 6d. per lb., according to quantity. 18s. per lb. ex Gum.
AMMONIUM CARBONATE B.P.—£36 per ton. Powder, £39 per ton in 5 cwt. casks. Resublimated, 1s. per lb.
ATROPHINE SULPHATE.—9s. per oz.
BARBITONE.—5s. 9d. to 6s. per lb.
BENZONAPHTHOL.—3s. to 3s. 3d. per lb. spot.
BISMUTH CARBONATE.—9s. 9d. per lb.
BISMUTH CITRATE.—9s. 3d. per lb.
BISMUTH SALICYLATE.—8s. 9d. per lb.
BISMUTH SUBNITRATE.—8s. 3d. per lb.
BISMUTH NITRATE.—Cryst. 5s. 9d. per lb.
BISMUTH OXIDE.—12s. 3d. per lb.
BISMUTH SUBCHLORIDE.—10s. 9d. per lb.
BISMUTH SUBGALLATE.—7s. 9d. per lb. Extra and reduced prices for smaller and larger quantities of all bismuth salts respectively.
BISMUTHI ET AMMON LIQUOR.—Cit. B.P. in W. Qts. 1s. 0½d. per lb.; 12 W. Qts. 11½d. per lb.; 36 W Qts. 11d. per lb.
BORAX B.P.—Crystal, 24s. to 27s. per cwt.; powder, 25s. to 28s. per cwt., according to quantity. Carriage paid any station in Great Britain, in ton lots.
BROMIDES.—Ammonium, 2s. to 2s. 3d. per lb.; potassium, 1s. 8½d. to 1s. 11½d. per lb.; sodium, 1s. 11d. to 2s. 2d. per lb.; granulated, ½d. per lb. less; all spot. Large quantities at lower rates.
CALCIUM LACTATE.—B.P., 1s. 2½d. to 1s. 3d. per lb.
CAMPHOR.—Refined flowers, 2s. 11d. to 3s. per lb., according to quantity; also special contract prices.
CHLORAL HYDRATE.—3s. 2d. to 3s. 4d. per lb.
CHLOROFORM.—2s. 5½d. to 2s. 7½d. per lb., according to quantity.
CREOSOTE CARBONATE.—6s. per lb.
ETHERS.—S.G. ·730—11d. to 1s. per lb., according to quantity other gravities at proportionate prices.
FORMALDEHYDE, 40%.—37s. per cwt., in barrels, ex wharf.
GUAIACOL CARBONATE.—4s. 6d. to 4s. 9d. per lb.
HEXAMINE.—1s. 11d. to 2s. 2d. per lb.
HOMATROPINE HYDROBROMIDE.—30s. per oz.
HYDRASTINE HYDROCHLORIDE.—English make offered at 120s. per oz.
HYDROGEN PEROXIDE (12 VOLS.).—1s. 4d. per gallon, f.o.r. makers' works, naked. Winchesters, 2s. 11d. per gall. B.P., 10 vols., 2s. to 2s. 3d. per gall.; 20 vols., 4s. per gall.
HYDROQUINONE.—3s. 9d. to 4s. per lb., in cwt. lots.
HYPOPHOSPHITES.—Calcium, 2s. 9d. per lb.; potassium, 3s. per lb.; sodium, 2s. 11d. per lb., in 1 cwt. lots, assorted.
IRON AMMONIUM CITRATE.—B.P., 2s. 8d. to 2s. 11d. per lb. Green, 3s. 1d. to 3s. 4d. per lb.; U.S.P., 2s. 9d. to 3s. per lb.
IRON PERCHLORIDE.—18s. to 20s. per cwt., according to quantity.
IRON QUININE CITRATE.—B.P., 8¾d. to 9¼d. per oz., according to quantity.
MAGNESIUM CARBONATE.—Light commercial, £31 per ton net.
MAGNESIUM OXIDE.—Light commercial, £62 10s. per ton, less 2½%; Heavy commercial, £21 per ton, less 2½%; in quantity lower; Heavy Pure, 2s. to 2s. 3d. per lb.
MENTHOL.—A.B.R. recrystallised B.P., 22s. per lb. net; Synthetic, 11s. to 13s. per lb.; Synthetic detached crystals, 11s. to 16s. per lb., according to quantity; Liquid (95%), 9s. 6d. per lb.
MERCURIALS B.P.—Up to 1 cwt. lots, Red Oxide, crystals, 8s. 4d. to 8s. 5d. per lb., levig., 7s. 10d. to 7s. 11d. per lb.; Corrosive Sublimate, Lump, 6s. 7d. to 6s. 8d. per lb., Powder, 6s. to 6s. 1d. per lb.; White Precipitate, Lump, 6s. 9d. to 6s. 10d. per lb., Powder, 6s. 10d. to 6s. 11d. per lb., Extra Fine, 6s. 11d. to 7s. per lb.; Calomel, 7s. 2d. to 7s. 3d. per lb.; Yellow Oxide, 7s. 8d. to 7s. 9d. per lb.; Persulph, B.P.C., 6s. 11d. to 7s. per lb.; Sulph. nig., 6s. 8d. to 6s. 9d. per lb. Special prices for larger quantities.
METHYL SALICYLATE.—1s. 3d. to 1s. 6d. per lb.
METHYL SULPHONAL.—8s. 9d. to 9s. per lb.
METOL.—9s. to 11s. 6d. per lb. British make.
PARAFORMALDEHYDE.—1s. 9d. per lb. for 100% powder.
PARALDEHYDE.—1s. 4d. per lb.
PHENACETIN.—2s. 5d. to 2s. 8d. per lb.
PHENAZONE.—3s. 9d. to 4s. per lb.
PHENOLPHTHALEIN.—6s. to 6s. 3d. per lb.
POTASSIUM BITARTRATE 99/100% (Cream of Tartar).—97s. per cwt., less 2½ per cent.
POTASSIUM CITRATE.—B.P.C., 2s. 6d. to 2s. 9d. per lb.
POTASSIUM FERRICYANIDE.—1s. 9d. per lb., in cwt. lots.
POTASSIUM IODIDE.—16s. 8d. to 17s. 2d. per lb., according to quantity.
POTASSIUM METABISULPHITE.—6d. per lb., 1-cwt. kegs included f.o.r. London.
POTASSIUM PERMANGANATE.—B.P. crystals, 5½d. per lb., spot.
QUININE SULPHATE.—1s. 8d. to 1s. 9d. per oz., bulk in 100 oz. tins.
RESORCIN.—2s. 10d. to 3s. per lb., spot.
SACCHARIN.—47s. per lb.; in quantity lower.
SALOL.—2s. 3d. to 2s. 6d. per lb.
SODIUM BENZOATE, B.P.—1s. 8d. to 1s. 11d. per lb.
SODIUM CITRATE, B.P.C., 1911.—2s. 3d. to 2s. 6d. per lb., B.P.C. 1923—2s. 8d. to 2s. 9d. per lb. U.S.P., 2s. 6d. to 2s. 9d. per lb., according to quantity.
SODIUM FERROCYANIDE.—4d. per lb., carriage paid.
SODIUM HYPOSULPHITE, PHOTOGRAPHIC.—£15 per ton, d/d consignee's station in 1-cwt. kegs.
SODIUM NITROPRUSSIDE.—16s. per lb.
SODIUM POTASSIUM TARTRATE (ROCHELLE SALT).—95s. to 100s. per cwt. Crystals, 5s. per cwt. extra.
SODIUM SALICYLATE.—Powder, 1s. 6d. to 1s. 7d. per lb. Crystal, 1s. 7d. to 1s. 8d. per lb.
SODIUM SULPHIDE, PURE RECRYSTALLISED.—10d. to 1s. 1d. per lb.
SODIUM SULPHITE, ANHYDROUS.—£27 10s. to £28 10s. per ton, according to quantity. Delivered U.K.
SULPHONAL.—6s. 6d. to 6s. 9d. per lb.
TARTAR EMETIC, B.P.—Crystal or powder, 2s. 1d. to 2s. 3d. per lb.
THYMOL.—Puriss., 9s. 1d. to 9s. 4d. per lb., according to quantity. Firmer. Natural, 12s. 6d. per lb.

Perfumery Chemicals

ACETOPHENONE.—6s. 6d. per lb.
AUBEPINE (EX ANETHOL).—11s. per lb.
AMYL ACETATE.—2s. 6d. per lb.
AMYL BUTYRATE.—4s. 6d. per lb.
AMYL SALICYLATE.—2s. 9d. per lb.
ANETHOL (M.P. 21/22° C.).—5s. 3d. per lb.
BENZYL ACETATE FROM CHLORINE-FREE BENZYL ALCOHOL.—1s. 10d. per lb.
BENZYL ALCOHOL FREE FROM CHLORINE.—1s. 10d. per lb.
BENZALDEHYDE FREE FROM CHLORINE.—2s. 6d. per lb.
BENZYL BENZOATE.—2s. 3d. per lb.
CINNAMIC ALDEHYDE NATURAL.—15s. 6d. per lb.
COUMARIN.—8s. 6d. per lb.
CITRONELLOL.—10s. per lb.
CITRAL.—8s. 3d. per lb.
ETHYL CINNAMATE.—6s. per lb.
ETHYL PHTHALATE.—2s. 9d. per lb.
EUGENOL.—14s. per lb.
GERANIOL (PALMAROSA).—22s. per lb.
GERANIOL.—6s. 6d. to 10s. per lb.
HELIOTROPINE.—4s. 9d. to 5s. per lb.
ISO EUGENOL.—16s. per lb.
LINALOL.—Ex Bois de Rose, 12s. 6d. per lb. Ex Shui Oil, 9s. per lb.
LINALYL ACETATE.—Ex Bois de Rose, 17s. per lb. Ex Shui Oil Linalol. 10s. per lb.
METHYL ANTHRANILATE.—8s. per lb.
METHYL BENZOATE.—4s. per lb.
MUSK KETONE.—34s. per lb.
MUSK XYLOL.—7s. per lb.
NEROLIN.—3s. 9d. per lb.
PHENYL ETHYL ACETATE.—11s. per lb.
PHENYL ETHYL ALCOHOL.—10s. per lb.
RHODINOL.—50s. per lb.
SAFROL.—1s. 10d. per lb.
TERPINEOL.—1s. 6d. per lb.
VANILLIN.—18s. 6d. per lb.

Essential Oils

ALMOND OIL.—Foreign S.P.A., 9s. 6d. per lb.
ANISE OIL.—2s. 9d. per lb.
BERGAMOT OIL.—23s. 6d. per lb.
BOURBON GERANIUM OIL.—21s. per lb.
CAMPHOR OIL.—1s. per lb.
CANANGA OIL, JAVA.—11s. per lb.
CASSIA OIL, 80/85%.—6s. per lb.
CINNAMON OIL LEAF.—9s. 3d. per oz.
CITRONELLA OIL.—Java, 2s. per lb., c.i.f. U.K. port. Ceylon, pure, 2s. 2d. per lb.
CLOVE OIL (90/92%).—11s. per lb.
EUCALYPTUS OIL, AUSTRALIAN, B.P. 70/75%.—1s. 10½d. per lb.
LAVENDER OIL.—Mont Blanc, 38/40%, 17s. 6d. per lb.
LEMON OIL.—17s. 9d. per lb.
LEMONGRASS OIL.—4s. per lb.
ORANGE OIL, SWEET.—26s. 6d. per lb.
OTTO OF ROSE OIL.—Anatolian, 35s. per oz. Bulgarian, 75s. per oz.
PALMA ROSA OIL.—13s. per lb.
PEPPERMINT OIL.—English, 87s. 6d. per lb.; Wayne County, 15s. 6d. per lb.; Japanese, 7s. 9d. per lb.
PETITGRAIN.—10s. per lb.
SANDALWOOD.—Mysore, 28s. per lb.: 90/95%. 18s. 9d. per lb.

London Chemical Market

The following notes on the London Chemical Market are specially supplied to* THE CHEMICAL AGE *by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., and may be accepted as representing these firms' independent and impartial opinions.

London, March 14, 1929.

STEADY conditions continue in this market, the volume of business being up to the average of the preceding week. Prices show little change and in the main continue firm. Export trade is satisfactory.

General Chemicals

ACETONE.—No important change in the price or condition of supply is noted, the product being in brisk demand at from £75 to £85, according to quantity and position.

ACID ACETIC.—A little more business has been put through at £36 10s. per ton for 80% technical and £37 per ton for 80% pure, at which prices the market is firm.

ACID CITRIC.—Only a small trade is passing for early delivery at 2s. 1d. to 2s. 3d. per lb. with an inclination towards higher prices for forward delivery.

ACID FORMIC.—More interest has been shown in this, and business is fair. Price unchanged at £43 10s. for 85%.

ACID LACTIC.—Only a small trade is passing at £43 per ton for 50% weight technical quality.

ACID OXALIC.—More business is being done in this acid, which continues firm at £30 10s. to £32 10s. per ton.

ACID TARTARIC is in better request and the price continues firm at 1s. 4½d. per lb., less 5%.

ALUMINA SULPHATE.—Supplies for near delivery are short and prices are very firm at £7 10s. to £8. Demand is brisk.

AMMONIUM CHLORIDE.—An active demand is being received, with prices firm.

ARSENIC.—Little change is noted, the market being quiet at about £16 5s. per ton at the mines.

BARIUM CHLORIDE.—The market is still rather short of supplies for early delivery and the price is firm at £11 10s. to £12. Demand continues brisk for near and forward business.

CREAM OF TARTAR.—A better inquiry is on the market, and the price continues steady at £93 to £97 10s. per ton for B.P. 99/100%.

COPPER SULPHATE.—Substantial increases have been made in the price, following the heavy advance in the metal. Demand is brisk. Present prices nominally £28 to £30 per ton.

FORMALDEHYDE.—Quite a good demand, with price firm at £39 per ton.

LEAD ACETATE.—An increase in the volume of business is reported, with price standing firm at £42 10s. per ton for white and £41 10s. for brown.

LEAD NITRATE.—Steady and in fair request at £36 per ton, carriage paid.

LIME ACETATE.—Great activity is noticed in this product, especially for export. Grey material remains scarce and firm at £18 per ton.

LITHOPONE.—Unchanged at £19 15s. to £22 per ton, according to quantity, with a good demand.

METHYL ACETONE.—In active demand at about £58 to £60 per ton, at which range the market is firm.

POTASSIUM CARBONATE AND CAUSTIC.—Unchanged at previous prices, which are firm with a fair business.

POTASSIUM CHLORATE.—Unchanged at the firm rates of £28 to £30 per ton, with a good demand.

POTASSIUM PERMANGANATE.—A steady trade is passing at about 5½d. for B.P. quality.

POTASSIUM PRUSSIATE.—Active demand at £63 10s. to £65 10s. per ton, with a firmer tendency.

SODIUM ACETATE.—In steady demand at £21 5s. to £22 5s. per ton, according to quantity, for first-class crystal quality.

SODIUM BICHROMATE.—Continues firm at 3½d. per lb., less 2½% contract rebate, at which figure a steady trade is passing.

SODIUM CHLORATE.—A fair trade is passing at about £25 per ton.

SODIUM HYPOSULPHITE.—Unchanged at British makers' prices.

SODIUM NITRITE.—A steady trade is being done at about £20 per ton, at which price the market is firm.

SODIUM PHOSPHATE.—Unchanged at £12 per ton for di-basic and £17 for tri-basic, with a fair demand.

SODIUM PRUSSIATE.—Slightly higher prices are quoted at 4¾d. to 5¼d. per lb., according to quantity, with position very firm.

SODIUM SULPHIDE.—A steady trade is passing at British makers' prices, which are unchanged.

TARTAR EMETIC.—A small trade is passing at 10½d. per lb.

ZINC SULPHATE.—Market is firmer at £12 10s., with a good demand.

Coal Tar Products

The market for coal tar products remains very quiet, but owing to the recent rise in petrol, benzols, solvent naphtha, etc., have been increased in price.

MOTOR BENZOL is still scarce, and has been sold at 1s. 8¾d. per gallon f.o.r. makers' works.

SOLVENT NAPHTHA has realised 1s. 3d. per gallon f.o.r. makers' works naked.

HEAVY NAPHTHA is being quoted at 1s. 2½d. per gallon.

CREOSOTE OIL still remains weak, the price on rails in the North being 4¾d. per gallon, and 5½d. per gallon in London.

CRESYLIC ACID is unchanged, the 98/100% quality being quoted at about 1s. 10d. per gallon, and the dark quality 95/97% at about 1s. 8d. per gallon f.o.r.

NAPHTHALENE.—The firelighter quality remains at about £4 10s. per ton, the 74/76 quality at £5 per ton, and the 76/78 quality at £6 to £6 5s. per ton.

PITCH is slightly weaker, at 30s. to 33s. per ton, f.o.b.

Nitrogen Products

THE price for sulphate of ammonia remains unchanged at £10 2s. per ton f.o.b. U.K. port in single bags. It is understood that there have been several inquiries for prompt delivery from the West Indies, and from the Far East. At present there is very little interest in forward positions.

Home.—Merchants all over the country report an enormous demand for sulphate of ammonia since the fine weather commenced. The scale price of £10 13s. per ton remains in force until the end of June.

Nitrate of Soda.—There is no change in the price of this product; it is understood that the demand is quite satisfactory.

Latest Oil Prices

LONDON, March 13.—LINSEED OIL was inactive. Spot ex-mill, £29 15s.; March to April, £28 10s.; May-August, £29; and September-December, £29 12s. 6d., naked, ex mill. RAPE OIL was quiet. Crude extracted, £42; technical refined, £44, naked, ex wharf. COTTON OIL was quiet. Egyptian crude, £28 10s.; refined common edible, £34; and deodorized, £36, naked, ex mill. TURPENTINE was slow—unchanged. American, spot, 45s. 6d., April to June, 45s. 9d. per cwt.

HULL, March 13.—LINSEED OIL.—Spot to April, £28 15s.; May-August, £29; September-December, £29 5s. per ton, naked. COTTON OIL.—Bombay crude, spot, £27 10s.; Egyptian crude, spot (new), March and April, £28 5s.; edible refined, March and April, £31 10s.; technical, spot, £31 5s.; deodorized, spot, £33 10s. per ton, naked. PALM KERNEL OIL.—Crushed, 5½ per cent., £35 10s. per ton, naked. GROUNDNUT OIL.—Crushed-extracted, £34 10s.; deodorized, £38 10s. per ton. SOYA OIL.—Extracted and crushed, £30 10s.; deodorized, £34 per ton, naked. RAPE OIL.—Crushed-extracted, £42 10s.; refined, £44 10s. per ton, net cash terms, ex mill. TURPENTINE, CASTOR OIL, and COD OIL unchanged.

South Wales By-Products

SLIGHTLY better conditions are evident in South Wales by-product activities. Pitch has a better demand, but values are unchanged round 33s. to 35s. per ton. Crude tar has improved, and has a steady, if moderate, call at 30s. to 32s. per ton. Road tar maintains its brighter tendency, and there is good buying, with values steady at 11s. to 14s. per 40-gal. barrel. Solvent naphtha is not quite so good, but prices are unchanged at 1s. 2d. to 1s. 4d. per gallon. Heavy naphtha is unchanged, there being very little buying at quotations of 11d. to 1s. per gallon. Refined tars are holding well, and values are unchanged, coke oven tar being quoted at 7d. to 7¾d. per gallon delivered, and gasworks tar at 6½d. to 7d. per gallon delivered. Crude naphthalene has practically no demand round the 80s. per ton mark, and a similar remark applies to whizzed at 100s. per ton. Patent fuel and coke exports continue to improve, but have a long way to go before a satisfactory export is reached. Patent fuel, ex-ship, Cardiff, from 21s. to 21s. 6d. per ton; ex-ship, Swansea, from 19s. to 19s. 3d. per ton. Coke, best foundry, 32s. 6d. to 36s. 6d.; good foundry, 26s. 6d. to 32s., and furnace from 19s. to 21s. per ton.

Scottish Chemical Market

The following notes on the Scottish Chemical Market are specially supplied to THE CHEMICAL AGE *by Messrs. Charles Tennant and Co., Ltd., Glasgow, and may be accepted as representing the firm's independent and impartial opinions.*

Glasgow, March 13, 1929.

THERE is little change to report in the heavy chemical market during the past week, business being still only on a moderate scale. Prices remain unchanged.

Industrial Chemicals

ACETONE B.G.S.—£76 10s. to £85 per ton, ex wharf, according to quantity. Inquiry remains satisfactory.

ACID ACETIC 98/100%.—Glacial, £56 to £67 per ton according to quality and packing, c.i.f. U.K. ports; 80% pure, £37 10s. per ton, ex wharf; 80% technical, £37 10s. per ton, ex wharf.

ACID BORIC.—Crystals, granulated or small flakes, £30 per ton; powder, £32 per ton, packed in bags, carriage paid U.K. stations. There are a few fairly cheap offers made from the Continent.

ACID CARBOLIC, ICE CRYSTALS.—Unchanged at 6¼d. per lb., delivered or f.o.b. U.K. ports.

ACID CITRIC, B.P. CRYSTALS.—Quoted 2s. 2½d. per lb., less 5%, ex store, spot delivery. Offered at 2s. 2¼d. per lb., less 5% ex wharf, prompt shipment from the Continent.

ACID HYDROCHLORIC.—Usual steady demand. Arsenical quality, 4s. per carboy. Dearsenicated quality, 5s. 6d. per carboy, ex works, full wagon loads.

ACID NITRIC.—80° quality, £24 10s. per ton, ex station, full truck loads.

ACID OXALIC 98/100%.—Spot material rather easier and some supplies obtainable at a fraction less than 3½d. per lb., ex store. Offered for prompt shipment from the Continent at 3¼d. per lb., ex wharf.

ACID SULPHURIC.—£2 15s. per ton, ex works for 144° quality; £5 15s. per ton for 168° quality. Dearsenicated quality, 20s. per ton extra.

ACID TARTARIC, B.P. CRYSTALS.—Spot material now quoted 1s. 4½d. per lb., less 5%, ex wharf.

ALUMINA SULPHATE.—Spot material rather dearer at about £6 per ton, ex store. For prompt shipment £5 15s. per ton, c.i.f. U.K. ports.

ALUM LUMP POTASH.—Unchanged at about £8 12s. 6d. per ton, c.i.f. U.K. ports. Crystal meal offered on spot at £9 per ton, ex store.

AMMONIA ANHYDROUS.—Quoted 9½d. per lb., carriage paid, containers extra and returnable.

AMMONIA CARBONATE.—Lump quality quoted £36 per ton; powdered, £38 per ton, packed in 5 cwt. casks, delivered U.K. stations or f.o.b. U.K. stations.

AMMONIA LIQUID 880°.—Unchanged at about 2½d. to 3d. per lb., delivered according to quantity.

AMMONIA MURIATE.—Grey galvanisers crystals of British manufacture quoted £21 to £22 per ton, ex station. Fine white crystals offered from the Continent at about £17 5s. per ton, c.i.f. U.K. ports.

ANTIMONY OXIDE.—Quotations from China are rather higher and to-day's price is about £35 10s. per ton, c.i.f. U.K. ports, prompt shipment. Spot material quoted £39 10s. per ton, ex store.

ARSENIC WHITE POWDERED.—Quoted £18 10s. per ton, ex wharf, prompt despatch from mines. Spot material on offer at £19 15s. per ton, ex store.

BARIUM CHLORIDE.—On offer from the Continent at £10 5s. per ton, c.i.f. U.K. ports.

BLEACHING POWDER.—British manufacturers' contract price to consumers unchanged at £6 12s. 6d. per ton delivered in minimum 4-ton lots. Continental now offered at about the same figure.

CALCIUM CHLORIDE.—Remains unchanged. British manufacturers' price, £4 5s. to £4 15s. per ton according to quality and point of delivery. Continental material on offer at £3 12s. 6d. per ton, c.i.f. U.K. ports.

COPPERAS, GREEN.—Unchanged at about £3 10s. per ton, f.o.r. works or £4 12s. 6d. per ton, f.o.b. U.K. ports.

COPPER SULPHATE.—Steady and price about £25 15s. per ton, ex wharf.

FORMALDEHYDE 40%.—Good inquiry and price unchanged at about £37 10s. per ton, ex store.

GLAUBER SALTS.—English material quoted £4 10s. per ton, ex station. Continental on offer at about £3 5s. per ton, ex wharf.

LEAD, RED.—On offer at £29 15s. per ton, ex store.

LEAD, WHITE.—Quoted £37 10s. per ton, c.i.f. U.K. ports.

LEAD ACETATE.—White crystals quoted £41 10s. per ton. Brown on offer at about £39 10s. per ton, ex store.

MAGNESITE GROUND CALCINED.—Quoted £8 10s. per ton, ex store. In moderate demand.

METHYLATED SPIRITS.—Industrial quality 64 O.P. quoted 1s. 4d. per gallon, less 2½% delivered.

POTASSIUM BICHROMATE.—Quoted 4¼d. per lb. delivered U.K. or c.i.f. Irish ports, with an allowance of 2½% for minimum 2½ tons to be taken.

POTASSIUM CARBONATE 96/98%.—Spot material now quoted £26 10s. per ton, ex store. Offered from the continent £25 10s. per ton c.i.f. U.K.

POTASSIUM CHLORATE 99¾/100%.—Powder, quoted £25 10s. per ton, ex wharf; crystals, 30s. per ton extra.

POTASSIUM NITRATE.—Refined granulated quality quoted £19 2s. 6d. per ton, c.i.f. U.K. ports. Spot material on offer at about £20 10s. per ton, ex store.

POTASSIUM PERMANGANATE, B.P. CRYSTALS.—Quoted 5¼d. per lb., ex wharf.

POTASSIUM PRUSSIATE (YELLOW).—Offered for prompt shipment from the continent at 6⅛d. per lb., ex wharf. Spot material quoted 7d. per lb., ex store.

SODA CAUSTIC.—Powdered 98/99%, now £17 10s. per ton in drums; £18 15s. per ton in casks. Solid 76/77%, £14 10s. per ton in drums; 70/72%, £14 2s. 6d. per ton, in drums—all carriage paid buyers' station, minimum four-ton lots; for contracts 10s. per ton less.

SODIUM ACETATE.—65% crystal quality quoted about £19 15s. per ton, ex wharf; 73/78% anhydrous quality on offer at £20 per ton, carriage paid buyers' stations.

SODIUM BICARBONATE.—Refined recrystallised £10 10s. per ton, ex quay or station. M.W. quality 30s. per ton less.

SODIUM BICHROMATE.—3½d. per lb., delivered U.K. or c.i.f. Irish ports, less 2½% for contract of minimum 2½ tons.

SODIUM CARBONATE (SODA CRYSTALS).—£5 to £5 5s. per ton, ex quay or station; powdered or pea quality, 27s. 6d. per ton extra. Light Soda Ash, £7 1s. 3d. per ton, ex quay, minimum four-ton lots, with various reductions for contracts.

SODIUM HYPOSULPHITE.—Large crystals of English manufacture quoted £8 17s. 6d. per ton, ex station, minimum four-ton lots. Pea crystals on offer at £14 15s. per ton, ex station, minimum four-ton lots. Prices for this year unchanged.

SODIUM NITRATE.—Ordinary quality quoted £10 12s. per ton, carriage paid, buyers' siding, minimum six-ton lots, usual extras for small quantities and refined qualities.

SODIUM SULPHATE (SALTCAKE).—Prices 50s. per ton, ex works; 52s. 6d. per ton, delivered for unground quality. Ground quality 2s. 6d. per ton extra.

SODIUM SULPHIDE.—Prices for home consumption. Solid 60/62%, £9 per ton. Broken 60/62%, £10 per ton. Crystals 30/32%, £7 2s. 6d. per ton, delivered buyers' works on contract, minimum four-ton lots. Special prices for some consumers. Spot material, 5s. per ton extra.

SULPHUR.—Flowers, £12 per ton; roll, £10 10s.; rock, £10 7s. 6d.; ground American, £9 5s.—ex store.

ZINC CHLORIDE 98%.—British material now quoted £22 10s. per ton f.o.b. U.K. ports.

ZINC SULPHATE.—Offered from the continent at about £10 5s. per ton, ex wharf.

NOTE.—The above prices are for bulk business, and are not to be taken as applicable to small parcels.

A Handbook of British Chemical Manufacture

ON behalf of the Association of British Chemical Manufacturers, of 166, Piccadilly, London, W.1, Ernest Benn, Ltd., have just published the 1929 edition of *British Chemicals: Their Manufacturers and Uses* (pp. 298, 10s. 6d.). This is the official directory of the Association, and it is hardly necessary to say that it is indispensable to all purchasers of chemicals. The directory is printed in English, French, Spanish, Italian, Portuguese, and German. Last issued in 1927, it has now been brought fully up to date. It is intended to bring out an up-to-date edition every second year. The book opens with a directory of the member firms of the Association, followed by a list of affiliated associations. Then follows the classified (alphabetical) list of products, giving names of substances, manufacturers, and uses. Next comes a list of proprietary and trade names, giving the chemical description and manufacturer of each substance. Finally, there is an alphabetical index to the chemical products mentioned in the book. It may be added that the Association is always ready and anxious to give advice to intending purchasers. In the polylingual character of this directory the Association gives a splendid lead to those who desire to increase the export trade of this country.

Manchester Chemical Market

(From Our Own Correspondent.)

Manchester, March 14, 1929.

Conditions in the chemical market here during the past week have been somewhat patchy, although the experience of one or two sellers is that business has been on a rather better scale, with a fair volume of inquiry in circulation. As before, specifications for deliveries against contracts are being received satisfactorily, having regard to conditions in the cotton trade of Lancashire, and the course of values continues steady.

Heavy Chemicals

Bleaching powder is moving off in moderate quantities, with British material quoted in the neighbourhood of £7 per ton; supplies of foreign are on offer at competitive prices. There has been a quiet demand about for chlorate of soda, quotations for which are at round 2¾d. per lb. Sales of caustic soda are of a steady character and contract prices are firm at from £12 15s. to £14 per ton, according to quality. Sulphide of sodium meets with a moderate amount of inquiry, with offers of the 60/65 per cent. concentrated solid quality at £9 10s. per ton, and of the commercial product at round £8. Saltcake is in somewhat quiet request, but at about £2 12s. 6d. per ton there has been little or no alteration in the price situation. Phosphate of soda keeps fairly steady at from £12 to £12 10s. per ton, sales of this material being on moderate lines. There is no special feature regarding the demand for hyposulphite of soda, but values are reasonably steady at from £15 5s. to £15 10s. per ton for the photographic kind and about £9 for the commercial. Both bicarbonate of soda and alkali are fairly active sections of the market and quotations keep up at £10 10s. and round £6 per ton, respectively. With regard to bichromate of soda, this is selling in fair quantities and values are fully maintained on the basis of 3½d. per lb. Prussiate of soda prices keep firm at from 4½d. to 5d. per lb., according to quantity, and the demand for this material is of a quietly steady character.

Chlorate of potash meets with a moderate amount of inquiry, with current offers at round 3d. per lb. Permanganate of potash has been in rather quiet request, though quotations this week have been fairly steady, with the B.P. on offer at round 5¼d. per lb. and the commercial quality at 5d. to 5¼d. Yellow prussiate of potash meets with a moderately active demand at from 6¾d. to 7¼d. per lb., according to quantity. Caustic potash keeps firm at from £33 5s. per ton for prompt delivery of one to five-ton lots, and buying interest in this material has been about maintained at its recent level. Carbonate of potash is in fair request and values are well held at about £26 5s. per ton. Bichromate of potash keeps steady on the basis of 4½d. per lb., and the demand in this section is pretty regular.

On the whole, the demand for arsenic this week has been rather slow, with, however, little change in values, £16 5s. per ton at the mines for white powdered, Cornish makes, being about the top price. With regard to sulphate of copper, quotations remain distinctly firm at from £28 5s. to £28 10s. per ton, f.o.b. The demand for the lead products is on the quiet side, but prices are no easier; white acetate is on offer at about £40 per ton, and brown at £39, with nitrate ranging from about £34 to £35 per ton. The acetates of lime are steady and in fair demand at £8 15s. per ton for brown and round £17 for grey.

Acids and Tar Products

Tartaric acid maintains its renewed firm tendency at up to 1s. 4½d. per lb., and a moderate weight of business is being put through. The demand for citric acid is on the quiet side, with offers ranging from 2s. 2d. to 2s. 3d. per lb. There is not much stirring in the case of oxalic acid, but at about £1 11s. 6d. per cwt. values are practically unchanged on the week. Acetic acid is in fairly steady request at about £66 per ton for the glacial and £36 10s. per ton for the 80 per cent. commercial.

Among the by-products, creosote oil is quiet and easy at from 3¾d. to 4d. per gallon, naked. Pitch, also, is in slow demand for export at about £1 12s. 6d. per ton, f.o.b. Solvent naphtha is in moderate request at round 1s. 3d. per gallon, naked. Crystal carbolic acid is fairly active still, and prices are firm at 6¼d. per lb., f.o.b.; 60's crude continues to be offered at about 1s. 10d. per gallon, with prompt supplies not too plentiful.

Company News

Hadfields, Ltd.—The directors have decided to recommend a dividend for the year on the ordinary shares at the rate of 2½ per cent. less tax.

British Drug Houses, Ltd.—The directors recommend a dividend of 8 per cent., less tax, on the ordinary shares for the year ended December 31, 1928, payable on April 15, 1929.

Evans, Sons, Lescher and Webb.—An increase in profits from £15,495 to £17,048 is reported by the directors. Having regard to the improved position of the company's business, they propose to pay a full year's dividend on the 6 per cent. preference, and to ask for an allocation of £2,100 for directors' fees, leaving the carry forward at £2,791 against £3,246 brought in.

Cooper, McDougall and Robertson.—For the year ended September 30 last, the profits amounted to £262,082, and £18,770 was brought forward. A final dividend of 8 per cent. is proposed on the ordinary shares, making 15 per cent. for the twelve months, placing £30,000 to general reserve, £10,000 to special depreciation reserve, writing £10,000 off patents, and carrying forward £54,176.

International Nickel Co. of Canada.—The net earnings for 1928 on the old capital stock of 1,876,000 shares was $6.32 a share, compared with $3.30 a share in 1927. The operating profit was $14,550,000 and, after allowing for depreciation of the plant, the ore reserves, retirement and insurance reserves, the net profits were $12,399,000, compared with $6,064,000 for 1927.

Tarmac, Ltd.—The net profit for 1928 amounted to £80,186 (against £75,850 for 1927). Allowing for preference dividends for the year, and the amount written off for depreciation, £30,115 (against £29,925), there is a balance for disposal, including £2,017 brought forward, of £41,087. It is proposed to pay a dividend of 5½ per cent. on the ordinary shares for the year (against 4½ per cent.), to transfer £6,000 (against £4,000) to general reserve, and £500 (the same) to staff benevolent fund, and to allow £3,500 (the same) for directors' fees, leaving to be carried forward £5,158.

Benzol and By-Products.—After making full allowance for depreciation, management and all other expenses, the directors report a loss of £21,195 for year to September 30, 1928. This compares with a profit of £29,486 for 1926-27. After deducting credit balance of £5,236 brought in and adding £1,041 transferred to sinking fund account, there remains a net loss of £17,000. In their report the directors state that there was a depression of sale conditions on by-products side of company's business; consequently the directors regret it has not been possible to pay any dividend on the 6 per cent. cumulative participating preference shares

British Aluminium Co.—The profit for the year ended December 31, 1928, is £151,921, including the amount brought forward and, after making provision for taxation, charging the amounts required for the service of the Prior Lien Debentures and the Debenture stock, and after further setting aside the sum of £50,000 to depreciation reserve (raising the fund to £900,000), and £100,000 to the reserve fund (increasing the fund to £850,000), and a sum of £10,000 to the staff benefit fund. After providing for the dividend on the preference shares and for the interim dividend of 4 per cent. on the ordinary shares, the directors recommend a final dividend of 6 per cent., making 10 per cent. for the year, leaving a sum of £33,843 to be carried forward.

United Turkey Red.—The report of the directors for the year to December 31 last shows that after providing fully for repairs, depreciation, all charges and contingencies, the profit for the year amounts to £124,813 (a decrease of £53,000 as compared with the previous year), to which falls to be added the balance at credit of profit and loss account, carried forward from last year, £50,052, together making £174,865. After paying the dividends on the Preference shares for the year 1928 there remains the sum of £132,802, out of which the directors have paid an interim dividend of 3 per cent., less tax, on the ordinary shares, absorbing £20,475, and have placed to general reserve the sum of £20,000. They now recommend that a final dividend of 7 per cent., subject to income tax, be paid on the ordinary shares, which will take £47,775, leaving to be carried forward a balance of £44,552.

Two Chemical Engineering Volumes

Publications of the Institution and the Group

VOLUME 5 of the *Transactions of the Institution of Chemical Engineers* (for the year 1927) maintains and extends the high standard set by the earlier numbers of the series. The contents consist of fourteen papers delivered at various meetings of the Institution, as well as the presidential address for the year and various official matters such as the balance sheet and the annual report of the Council. An especially valuable feature of this journal is the fact that the discussion on each paper is printed with the paper, which gives the reader an opportunity of seeing every subject from more than one point of view. The subjects of the papers include the use of lead and rubber in the construction of chemical plant; developments in sulphuric acid plant; oil-cracking plant; crystallisation; submerged flame combustion; refrigeration; industrial lighting; and the properties of silica, etc. The volume is rounded off by the papers set at the Associate-Membership examinations for the year, together with the report of the board of examiners.

A parallel volume to the above is provided by Volume IX of *Proceedings* of the Chemical Engineering Group of the Society of Chemical Industry, also for the year 1927 (published by the Group, pp. 147, 10s. 6d.) The papers published number twelve, and deal with pyrometry, lubrication, fire extinction, cellulose, spray drying, the De Vecchis process of beet sugar manufacture, and oil pollution, among other things. In this volume also the discussions are appended to the papers. Considering the very congested state of the literature of other sciences, chemical engineers are fortunate in having as media for the publication of their work two such excellent journals as those here noticed.

Meeting of Continuous Coal Carbonisation

PRESIDING at the general meeting of Continuous Coal Carbonisation, Ltd., on Monday, March 4, Mr. S. Hunter-Gordon, the chairman, said that the directors were not responsible for the policy of expenditure incurred prior to the first weeks in January. The present balance sheet for which they took responsibility showed that the financial position of the company was now quite sound, the debts having been paid and all unproductive expenditure written off. The experimental work carried out at the company's works at Erith established the success of the process, the results being obtained at a trifling cost compared with the sum spent by other companies to produce a high-grade fuel by low temperature process. They had established an identity of interest with the Incandescent Heat Co., of Birmingham, whose managing director had joined the board. Mr. John Fallon said that his company—the Incandescent Heat Co.—specialised in the construction of all forms of furnaces and heating apparatus throughout the leading countries of the world.

The report was unanimously adopted and resolutions increasing the capital were approved.

Finsbury College Old Students

THE annual dinner of the Finsbury Technical College Old Students' Association was an entirely happy reunion at the Trocadero, London, recently. About 100 old students and guests were present. The past president (Mr. R. W. Paul) proposed "The Guests" in a witty speech, which was replied to in a like manner by Mr. L. St. L. Pendred (vice-president of the I.M.E.). Professor C. R. Darling poposed "The Association," and Mr. E. E. Moss, the president, spoke in reply. Those who, in the days when it flourished as the seat of learning of some of the finest technical men of the day, were students of the College, and who are not members of the Association, are requested to communicate with the honorary secretary, Mr. F. R. C. Rouse, 15, Clifton Gardens, Golders Green, N.W.11. The enjoyment of the evening was completed by a very fine musical entertainment, directed by Mr. C. B. Nadaud.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

County Court Judgments

[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]

HUTCHINSON (J.) AND CO., La Casa, Cavendish Road, Kersal, chemical manufacturers. (C.C., 16/3/29.) £15 14s. 11d. February 4.

London Gazette, &c.

Company Winding Up Voluntarily

ANGLO-POLISH CHEMICAL SYNDICATE, LTD. (C.W.U.V., 16/3/29.) By special resolution February 11th, confirmed February 27th, H. G. Judd, chartered accountant, 8, Fredericks Place, Old Jewry, E.C.2, appointed as liquidator.

Notice of Intended Dividend

HADDOCK, John, manufacturing chemist, 77, Whitehall Road, West Bromwich. Last day for receiving proofs, March 27. Trustee, C. Hoult, 191, Corporation Street, Birmingham, Official Receiver.

New Companies Registered

THE BRITISH NATIONAL PETROLEUM REFINERIES, LTD.—Registered as a "public" company on March 4. Nom. capital £60,000 in 1s. shares. To adopt an agreement with the Victoria Oil and Refining Co., Ltd., and to carry on the business of oil refiners, manipulators of crude and other oils, manufacturers of petrol, gasoline and all produce and products of oils and oil bearing substances, operators of oil and oil or gas wells in Great Britain and abroad, builders of oil refineries, oil and gas tanks, reservoirs, etc. A subscriber: F. H. Goodwin, 32, Tottenhall Road, Palmers Green, London, N.13.

CARBOLEEN CO., LTD., 34, Lower Abbey Street, Dublin.—Registered in Dublin on February 20. Nom. capital £3,000 in £1 shares. Dealers in chemicals, tar, oils, disinfectants, greasers, cattle-dips, etc. Directors: E. J. Dicker, C. A. MacParland and G. J. Burhenshaw.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

CREOSOTE.—The Director-General, India Stores Department, Belvedere Road, Lambeth, London, S.E.1, invites tenders for 700 tons creosote. Tenders due March 15. Forms of tender available from the above at a fee of 5s. (which will not be returned).

DRUGS AND INDUSTRIAL CHEMICALS.—A firm of commission agents established in Bucharest desire to obtain the representation of British manufacturers. (Partial repetition of Reference No. 185/28.) (Ref. No. 197.)

Appointments Vacant

ASSISTANT AGRICULTURAL CHEMIST at the Institute of Agriculture, Kirton, near Boston, Lincs.—The Principal. March 27.

ASSISTANT for work in connection with research on water pollution. Knowledge of German and experience in abstracting.—The Secretary, Department of Scientific and Industrial Research, 16, Old Queen Street, Westminster, London, S.W.1. March 20.